EXPLANATORY NOTES

for

FOREST SERVICE

DEPARTMENT OF AGRICULTURE

Fiscal Year

1960

CONTENTS

Project statements -

The obligations shown in the project statements are on the basis of the appropriations and activities proposed in the 1960 Budget Estimates. In some project statements, the activities are further divided into subcategories, reflecting a more detailed description of the work conducted under the appropriation items.

Obligations reflected as subcategories in the project statements, while generally obtained from accounting records, in some instances represent the best approximation available. Wherever it has been necessary to distribute costs to activities for which total amounts cannot be taken directly from the accounts, every effort has been made to allocate such charges as accurately as possible based on other available information such as past experience, special studies, cost analyses, etc.

Pay rate increase costs -

The budget estimates for 1960 include costs of $7,016,414 under appropriations to the Forest Service due to salary increases which became effective during fiscal year 1958 pursuant to P. L. 85-462. In 1959, supplemental estimate in the amount of $5,432,200 is anticipated to meet fiscal year 1959 costs of salary increases in the Forest Protection and Utilization appropriation, and this amount has been reflected in the project statement.

Project statements in this document reflect total pay act costs which have been distributed to the various projects for 1958, 1959, and 1960 as non-add figures in brackets.

C O N T E N T S

FOREST SERVICE

Purpose Statement

The Forest Service is responsible for promoting the conservation and wise use of the country's forest and related watershed lands, which comprises one-third of the total land area of the United States. Authority for the work of the Service stems from numerous acts, the more important ones being the Timber Culture Repeal Act of March 3, 1891; Sundry Civil Appropriation Act of June 4, 1897; "Transfer" Act of February 1, 1905; "Weeks" Act of March 1, 1911; Act of June 7, 1924; Forest Research Act of May 22, 1928; and Cooperative Forest Management Act of August 25, 1950.

To meet its responsibility the Forest Service engages in three main lines of work, as follows:

1. Management, protection, and development of the National Forests. The guiding principle is "the greatest good of the greatest number in the long run." This requires obtaining the maximum practicable yield and use of the many resources of the National Forests on a continuing basis, to meet both local and national needs--under normal conditions and during times of stress. The 181,000,000 acres of National Forests are located in 41 States and Puerto Rico. About one-third of the remaining saw timber in the country is in the National Forests.

In managing the National Forests, technical forestry is applied to the growing and harvesting of timber crops. Estimated harvest through timber sales in 1959 is 8.0 billion board feet. Grazing of approximately six million head of livestock is scientifically managed to obtain range conservation along with the use of the annual growth of forage. Watersheds are managed to regulate stream flow, prevent floods, and provide water for power, irrigation, navigation, and municipalities. Management includes the handling of more than 60,000,000 visits of people to the National Forests for recreation purposes. Scientific management is applied to the extensive wildlife resources. Receipts from timber sales, grazing permits, land rentals, and water power permits exceeded $91,000,000 in 1958.

The protection of the National Forests includes the control of forest fires, which numbered 10,780 in the first eleven months of the calendar year 1958; the control of tree diseases and insect epidemics; and the prevention of trespass.

The major development activities of the National Forests are reforestation, revegetation, construction of roads, recreational facilities, housing, and other necessary improvements and land acquisition and exchanges.

2. Cooperation with State and private forest landowners is provided by the Forest Service to obtain better fire protection on the 435,000,000 acres of State and privately-owned forest lands and to stimulate development and proper management of forest lands.

Under the Soil Bank Conservation Reserve Program the Forest Service is responsible for the technical phases of planting trees on land regularly used for crop production, and for tree seedling production, primarily through the facilities of State forestry departments.

3. Forest Research. The Forest Service conducts research in the entire field of forestry and the management of forest and related ranges. This includes the growth and harvesting of timber, its protection from fire, insects, and diseases, and the protection and management of watersheds. It conducts studies in forest economics, marketing of forest products, and a survey of the present extent and potential growth and use of the Nation's forest resources. It also conducts research to develop new and improved products from wood and to increase efficiency of utilizing forest products. Results of research are made available to owners of private forest and range lands, to public agencies which administer such lands, to forest products industries, and to consumers.

The Forest Service cooperates with the Agricultural Research Service of the Department by reviewing and appraising for technical adequacy forest research projects beneficial to the United States which are conducted abroad. These projects are carried out with foreign currencies under Section 104(k) of Public Law 480, as amended, and the expenses of the Forest Service in connection with this work are paid from this appropriation.

Other work related to forestry includes:

4. Insect and disease control. Under the Forest Pest Control Act (16 U.S.C. 594-1-594-5) and the Lea Act (16 U.S.C. 594a), destructive insect pests and diseases that threaten timber areas are suppressed. Activities include two types of work carried on jointly by Federal, State, and private agencies:

a. Surveys on forest lands to detect and appraise infestations of forest insects and infections of tree diseases and determine protective measures to be taken.

b. Control operations to suppress or eradicate forest insect pests and diseases, including the white pine blister rust.

5. Flood Prevention and Watershed Protection. On National Forest lands and on non-Federal forest lands within the watersheds authorized for treatment by the Department of Agriculture under the Flood Control Act of December 22, 1944, the Forest Service plans and installs watershed improvement measures, in the form of minor physical structures, cultural measures, and intensified fire control, to retard runoff and reduce flood water and sediment damage. Work on non-Federal land is carried on in cooperation with the Soil Conservation Service and the appropriate State and local agencies.

The Forest Service also cooperates with the Soil Conservation Service, appropriate State agencies and the local organizations sponsoring small watershed protection and flood prevention projects initiated under the Watershed Protection and Flood Prevention Act of 1954, as amended, in planning and installing forestry and related measures on the watersheds and in inter-agency studies of proposed water and land resource developments on river basins for the purpose of obtaining integrated resource development programs.

6. Land Utilization Projects. Under the authority of Title III of the Bankhead-Jones Farm Tenant Act (7 U.S.C. 1011-1012), the Forest Service manages land utilization projects covering areas of submarginal land.

The project lands and facilities are made available to States, local organizations, and farmers and ranchers at equitable rates under specific use conditions.

7. Work performed for others. The Forest Service is frequently called upon to perform services for other Federal, State, and private agencies on a reimbursable or advance payment basis. Examples of these activities are:

a. Protection of other Federal and non-Federal forest lands intermingled with the National Forests.

b. Disposal of slash resulting from sales of timber and the rehabilitation of such areas.

c. Construction and maintenance of roads, and other improvements.

d. Research investigations in forest, range, and water management and utilization problems.

e. Cooperative survey, mapping, administrative, and reforestation projects, etc.

f. Cooperation with defense and mobilization agencies on forest production and utilization projects, and related work.

The Forest Service maintains its central office in Washington with program activities decentralized to 10 Regional offices, 127 Forest Supervisors' offices, 791 District Rangers' offices, 9 Forest and Range Experiment Stations, and the Forest Products Laboratory. On November 30, 1958, the Forest Service had a total of 18,383 employees including 459 full-time employees in the central office and 15,425 full-time and 2,499 part-time employees in the field. The November 30 employment figures for the field are lower than average for the year because of seasonal factors. At the peak of the field season, the number of full-time employees is about 26,000 plus about 10,000 part-time and casual employees.

	Appropriated, 1959	Budget Estimates, 1960
Appropriated funds:		
National forest and other land management appropriations	a/ $106,363,000	$102,575,800
Cooperation with States	b/ 12,807,800	12,307,800
Research	16,526,400	14,026,400
Total appropriated funds (excluding permanent appropriations)	135,697,200	128,910,000

a/ Excludes $585,311 available from prior year balances.
b/ Excludes $8,775 available from prior year balances.

Summary of Appropriations, 1959, and Estimates, 1960

Appropriation Item	Estimated Available, 1959	Budget Estimates, 1960	Increase (+) or Decrease (-)
Forest protection and utilization:			
Forest land management	$79,603,000	$77,815,800	-$1,787,200
Forest research	16,526,400	14,026,400	-2,500,000
State and private forestry cooperation	12,807,800	12,307,800	-500,000
Total, Forest protection and utilization	108,937,200	104,150,000	-4,787,200
Forest roads and trails	26,000,000	24,000,000	-2,000,000
Acquisition of lands for Cache National Forest	a/ 50,000	50,000	- -
Acquisition of lands for national forests, Special Acts	10,000	10,000	- -
Cooperative range improvements	700,000	700,000	- -
Expenses, brush disposal (permanent)	5,000,000	5,000,000	- -
Roads and trails for States (permanent)	8,885,000	11,400,000	+2,515,000
Forest fire prevention (permanent)	b/ 20,000	20,000	- -
Restoration of forest lands and improvements (permanent)	100,000	100,000	- -
Payment to Minnesota (permanent)	48,000	48,000	- -
Payments due counties, submarginal land program (permanent)	400,000	400,000	- -
Payments to school funds, Arizona and New Mexico (permanent)	105,474	105,474	- -
Payments to States and Territories from the national forests fund (permanent)	22,215,000	28,575,000	+6,360,000
Construction of improvements, Salt Lake City, Utah (permanent)	- -	16,000	+16,000
Total	172,470,674	174,574,474	+2,103,800
Deduct permanent appropriations (shown in detail above)	-36,773,474	45,664,474	-8,891,000
Total (excluding permanent appropriations)	c/ 135,697,200	128,910,000	-6,787,200

a/ In addition, $53,416 available from prior year balances.
b/ In addition, $10,929 available from prior year balances.
c/ In addition, prior year balances available under the following items:
Acquisition of lands for Superior National Forest $531,895
Assistance to States for tree planting 8,775

(a) Forest Protection and Utilization

	Forest Land Management	Forest Research	State and Private Forestry Cooperation	Total
Appropriation Act, 1959	a/$75,107,000	$15,678,000	$12,720,000	a/$103,505,000
Transfer between sub-appropriations, for pest control projects b/	170,000	-155,000	-15,000	- -
Proposed supplemental, 1959, for pay act costs	4,326,000	1,003,400	102,800	5,432,200
Base for 1960	a/79,603,000	16,526,400	12,807,800	a/108,937,200
Budget Estimate, 1960	a/77,815,800	14,026,400	12,307,800	a/104,150,000
Net change, 1960 ...	-1,787,200	-2,500,000	-500,000	-4,787,200

a/ In addition, $700,000 is available by transfer from "Cooperative Range Improvements."

b/ A more complete explanation of these transfers is set forth in these Explanatory Notes under "Increases and Decreases."

SUMMARY OF INCREASES AND DECREASES, 1960

Forest Land Management:	
To strengthen administration of national forest timber sales ..	+2,800,000
Decrease for recreational facilities on national forest public-use areas	-1,485,400
Decrease in construction of employee housing and other structural improvements	-2,375,000
Decrease for emergency forest insect control projects	-726,800
Total, Forest Land Management	-1,787,200
Forest Research:	
Decrease to eliminate the non-recurring item for construction of research facilities provided in the 1959 appropriation ...	-2,500,000
State and Private Forestry Cooperation:	
Decrease in the Federal share of costs of producing trees for reforestation of State and private lands	-500,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	Increase or Decrease	1960 (estimated)
1. Forest Land Management:				
a. National forest protection and management:				
(1) Timber resource management:				
(a) Sales administration and management	$12,565,259	$13,520,000	+$2,800,000 (1)	$16,320,000
(b) Reforestation and stand improvement ..	2,205,248	3,015,000	- -	3,015,000
(2) Recreation-public use	8,593,995	9,985,400	-1,485,400 (2)	8,500,000
(3) Wildlife habitat management	485,996	805,000	- -	805,000
(4) Range resource management:				
(a) Management	1,739,797	1,670,000	- -	1,670,000
(b) Revegetation	1,247,137	1,500,000	- -	1,500,000
(c) Improvements	1,432,120	1,600,000	- -	1,600,000
(5) Soil and water management	906,247	1,370,000	- -	1,370,000
(6) Mineral claims, leases, and other land uses	3,022,137	3,385,000	- -	3,385,000
(7) Ranger district management	6,169,079	7,384,000	- -	7,384,000
(8) Land utilization projects	985,629	1,400,000	- -	1,400,000
(9) Forest fire protection	11,917,809	12,335,000	- -	12,335,000
(10) Structural improvements for fire and general purposes (construction and maintenance)	7,991,065	10,625,000	-2,375,000 (3)	8,250,000
Subtotal	59,261,518	68,594,400	-1,060,400	67,534,000
Deduct amount advanced from "Cooperative Range Improvements"	-735,629	-700,000	- -	-700,000
Subtotal, National forest protection and management	58,525,889	67,894,400	-1,060,400	66,834,000
b. Fighting forest fires .	9,272,996	5,000,000	- -	5,000,000
c. Insect and disease control:				
(1) White pine blister rust control	2,837,135	a/3,253,700	- -	a/3,253,700
(2) Other pest control .	3,402,220	3,354,900	-726,800 (4)	2,628,100
Subtotal, Insect and disease control	6,239,335	6,608,600	-726,800	5,881,800

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Project	1958	1959 (estimated)	Increase or Decrease	1960 (estimated)
d. Acquisition of lands (Weeks Act)	99,693	100,000	- -	100,000
Total, Forest Land Management	74,137,933	79,603,000	-1,787,200	77,815,800
2. Forest Research:				
a. Forest and range management research	5,787,088	6,880,000	- -	6,880,000
b. Forest protection research:				
(1) Forest fire research	633,395	785,000	- -	785,000
(2) Forest insect research	903,047	915,000	- -	915,000
(3) Forest disease research	712,114	740,000	- -	740,000
Subtotal, Forest protection research	2,248,556	2,440,000	- -	2,440,000
c. Forest products utilization research	2,402,007	2,794,400	- -	2,794,400
d. Forest resources research:				
(1) Forest survey	1,397,945	1,490,000	- -	1,490,000
(2) Economic research ..	383,403	422,000	- -	422,000
Subtotal, Forest resources research	1,781,348	1,912,000	- -	1,912,000
e. Forest research construction	- -	2,500,000	-2,500,000 (5)	- -
Total, Forest Research	12,218,999	16,526,400	-2,500,000	14,026,400
3. State and Private Forestry Cooperation:				
a. Cooperation in forest fire control	10,081,985	10,085,000	- -	10,085,000
b. Cooperation in forest tree planting	1,266,762	790,000	-500,000 (6)	290,000
c. Cooperation in forest management and processing	1,500,901	1,522,000	- -	1,522,000
d. General forestry assistance	356,027	410,800	- -	410,800
Total, State and Private Forestry Cooperation	13,205,675	12,807,800	-500,000	12,307,800
Total, Forest Protection and Utilization, Forest Service	99,562,607	108,937,200	-4,787,200	104,150,000
Unobligated balance	228,698	- -	- -	- -

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Project	1958	1959 (estimated)	Increase or Decrease	1960 (estimated)
Total pay act costs (P.L. 85-462)	[2,230,305]	[5,609,700]	[+125,000]	[5,734,700]
Total available or estimate	99,791,305	108,937,200 b/	-4,787,200	104,150,000
Transferred from "Conservation reserve, soil bank programs, Agriculture" ...	-2,211,305	- -		
Comparative transfer in 1959 Estimates to "Management of lands and resources," Bureau of Land Management, Department of the Interior	100,000	- -		
Proposed supplemental due to pay increases	- -	-5,432,200		
Total appropriation or estimate	97,680,000	103,505,000		

a/ Includes $361,410 to be allocated to the Department of the Interior.
b/ Includes $625,348 obligated in 1958 under the advance procurement authorization (P.L. 85-386).

INCREASES AND DECREASES

The net decrease of $1,787,200 proposed for the subappropriation "Forest Land Management" consists of:

(1) An increase of $2,800,000 for timber sale administration: (a) to provide for sale of 10 billion board feet and a cut of 8.5 billion board feet, (b) to establish a special small sale and salvage program, and (c) to finance higher unit costs of sales administration.

Need for Increase: Additional funds are urgently needed for the conduct of national-forest timber sales--a business with an estimated cut of 8.0 billion board feet and receipts of more than $100 million in fiscal year 1959. The Forest Service is by far the largest single supplier of raw material for the Nation's forest products industry. Many mills, both large and small, are primarily or wholly dependent on continuing or increasing purchases of national forest timber. Alternate sources for purchase of timber for major segments of the lumber and plywood industry in the Pacific Northwest have now been exhausted. This almost complete dependence on purchase of national-forest timber for continued operation makes the conduct of the national forest timber sales program more significant than ever. Sale of timber at the maximum feasible rate within sustained yield cutting limitations is an indispensable link in maintaining employment, payrolls, community stability, and an adequate supply of lumber and plywood for national consumptive needs.

Many mills must purchase timber to keep operating. The national forests are the one place where they can buy it. The job of selling it must be done by the Forest Service. This will keep mills going, provide jobs, and stimulate the general economy. To provide this additional timber

requires an increase in appropriation. Such increase in appropriation, however, will be more than offset by net returns to the Treasury from the sale of timber. This is a case of spending money to make money. It will help to reduce the deficit between income and outgo.

It is estimated that the proposed increase of $2,800,000 will provide gross returns to the Treasury of $10,000,000 ($6,500,000 net). This is only the direct returns from the on-the-ground timber sale operation. Timber on the stump valued at $10,000,000 when processed through trade channels (mills, manufacturing plants, transportation, retail outlets, and use in final construction) will provide a much greater value through increased business activity. Thus the investment of an additional $2,800,000 will not only benefit the management of national forest timber stands but provide increased receipts to the Treasury and strengthen the national economy.

The proposed increase would cover the following items:

(a) Regular Sales Program. In fiscal year 1958 a record high of 8.0 billion feet of timber was sold exclusive of a 50-year Alaska pulp-timber contract for 5.25 billion feet. This increasing interest in new sales was manifested even though actual volume cut in fiscal year 1958 was 6.4 billion feet as compared to 7.0 billion feet in fiscal year 1957.

The expansion in sale of timber indicates the increasing dependence of the forest products industry on national forest timber resources. It also reflects the anticipation of the lumber and plywood industry of an upturn in the market by next year.

The proposed increase would be used to expand the volume of timber sales to 10 billion board feet. This is an increase of 1.7 billion board feet over the planned rate of sales in fiscal year 1959. There is strong indication of need for this volume of sales in fiscal year 1960.

The volume of timber expected to be cut in fiscal year 1960 is approximately 8.5 billion feet, an increase of .5 billion over the planned cut for 1959. The volume of uncut timber under contract and the rate at which new sales are being made govern the volume of timber which is available for cutting but the actual volume cut depends on the activity of the timber purchasers, which in turn is affected by market conditions then current. Prospects are favorable for a good lumber market in fiscal year 1960.

(b) Special Small and Salvage Sales. Additional timber can be made available, primarily to the small business segment of the timber industry, by making small sales of timber particularly in need of cutting, mainly salvage of dead and insect or disease affected timber. While such sales are more costly than the ordinary sales the cash returns are still considerably more than the cost of administration. These salvage sales will improve the timber stand and help reduce the possible future loss of healthy timber from attacks by insects, disease, or fire.

Most of the material which would be included in these special small and salvage sales would deteriorate and be unmerchantable if cutting is deferred until it can be reached through an ordinary sale. Hence this special small and salvage sale program would result in Treasury returns and in material to support industry which otherwise will be lost.

Special small and salvage sales are proposed on 82 ranger districts at a cost of $820,000. A full-time man would be assigned to this special type of sale activity on these 82 selected ranger districts. Total expense per unit with travel and some temporary help would average about $10,000. Each unit would be expected to produce sales of around 5 million board feet annually with an average value of $5.00 per thousand board feet, or gross receipts to the Treasury of $25,000 ($16,250 net) per year for the expenditure of $10,000 per year.

(c) Increased Sale Standards. Timber sale unit costs were reviewed at field levels in 1958 to determine adequate allowances for sale preparation, volume determination, and sale administration. Since the previous review, made in 1954, it has been necessary to require higher standards of performance to meet the needs of more intensive management practices and to obtain more precise measurement of timber being sold and cut. The increased needs found in the 1958 field review are reflected in this request for increased funds.

Plan of Work:

Regular Sales	
Sale Preparation	
10.0 billion feet at $.43 per M bd. ft.	$4,300,000
Sale Administration	
8.5 billion feet at $1.13 per M bd. ft.	9,600,000
Special Small and Salvage Sales	
(Sell 410 million feet and cut 246 million feet)	820,000
Timber Inventories and Management Plans	1,600,000
Total	16,320,000
1959 appropriation (adjusted for pay act increase)	13,520,000
Increase requested	2,800,000

(2) A decrease of $1,485,400 for recreational facilities on national forest public use areas.

This decrease contemplates carrying out in 1960 the same level of program for "Operation Outdoors" as was proposed in the budget submitted to Congress for fiscal year 1959. The amount requested for fiscal year 1960 is $8,500,000 which represents the $8,020,000 requested in the 1959 budget plus $480,000 for pay act costs resulting from Public Law 85-462. This total of $8,500,000 will provide a relatively substantial program for this activity in 1960 in comparison with 1957 and prior years.

(3) A decrease of $2,375,000 for construction of employee housing and other structural improvements.

The estimate of $8,250,000 for construction and maintenance of employee housing and other structural improvements (lookouts, storage facilities, offices, telephone lines, etc.) will provide for the most urgent needs in 1960. This is a decrease of $2,375,000 below the funds available for this purpose in 1959 and will provide the same level of program as proposed in the 1959 budget.

(4) A decrease of $726,800 for emergency forest insect control projects.

In the fiscal year 1959 savings totaling $726,800, resulting from non-filling of vacancies, are planned for use in combating unforeseen forest pest outbreaks. This amount is distributed by subappropriations as follows:

Forest Land Management		$556,800
Forest Research	a/	155,000
State and Private Forestry Cooperation	a/	15,000
Total		726,800

a/ Transferred to Forest Land Management pursuant to 7% interchange authority (5 U.S.C. 572).

In view of the urgent need to undertake emergency control and eradication measures on several outbreaks of forest insects in the fiscal year 1959, this amount will be used during the current year for such purpose. Work planned on these projects will be completed in 1959. Therefore, the decrease of $726,800 will provide in 1960 for the same level of the program for Forest Pest Control as initially provided in 1959.

(5) A decrease of $2,500,000 in the subappropriation "Forest Research" to eliminate the non-recurring item for construction of forest research facilities provided in the 1959 appropriation as follows:

Gulfport, Mississippi	$350,000
Placerville, California	200,000
Rhinelander, Wisconsin	200,000
Grand Rapids, Minnesota	200,000
Lake City, Florida	200,000
Rapid City, South Dakota	100,000
Missoula, Montana	900,000
Columbus, Ohio	350,000
Total	2,500,000

It is anticipated that all of these facilities will be completed with the funds provided in 1959.

(6) A decrease of $500,000 in the activity "Cooperation in forest tree planting" under the subappropriation "State and Private Forestry Cooperation."

This program was undertaken in 1924 for the purpose of encouraging the planting of trees on inadequately stocked State and private forest lands. As the program has developed over the years, the financial responsibility assumed by the States and private owners has increased to the point where the non-Federal costs share is now about 80%. While a smaller Federal

contribution to provide leadership and incentive is proposed, it is believed the program should be continued at or near current levels with increased contributions from States and private landowners.

CHANGE IN LANGUAGE

The estimates include proposed change in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

For expenses necessary for forest protection and utilization, as follows:

Forest land management: For necessary expenses of the Forest Service, not otherwise provided for, including the administration, improvement, development, and management of lands under Forest Service administration, fighting and preventing forest fires on or threatening such lands and for liquidation of obligations incurred in the preceding fiscal year for such purposes, control of white pine blister rust and other forest diseases and insects on Federal and non-Federal lands; [$75,107,000] $77,815,800, of which $5,000,000 for fighting and preventing forest fires and [$1,760,000] $1,910,000 for insect and disease control shall be apportioned for use, * * *

This language change increases the contingency item for insect and disease control from $1,760,000 to $1,910,000. The proposed change will reflect the total amount available for control of forest pests which is consistent with past practice of showing the full amount as a contingency item.

STATUS OF PROGRAM

FOREST LAND MANAGEMENT

National Forest Protection and Management

Current Activities: The purpose of this program is to manage, protect, and develop the national forests and insure that timber, water, range, recreation, wildlife, and other resources are utilized in a manner so as to best serve the Nation.

National forests are managed under the multiple-use principle with practically all areas used for, or serving, more than one purpose or objective. For example, 50 percent of the area within the national forests of the continental United States serves five different purposes: (1) timber production, (2) watershed protection, (3) forage production, (4) wildlife production, and (5) recreation. An additional 28 percent serves four purposes in varying combinations. Of the remainder, 21 percent of the total serves three purposes with only one percent of the total reserved for one purpose exclusively, mainly campgrounds and special use areas, such as summer home sites, pastures, corrals, etc.

The varied interests which inevitably conflict and which must be reconciled, the vast areas covered, and the unusual complexities clearly require careful planning and skillful management of the national forest properties.

The protection of national forests from fire and trespass is made difficult by the large area to be protected, the general inaccessibility, the many thousands of miles of exterior boundary, and the impossibility of taking preventive action with such a problem as lightning-caused fires.

National forest boundaries encompass an aggregate area of 225 million acres in 41 States and Puerto Rico, of which some 181 million acres are under Forest Service administration. Many tracts of privately owned lands are interspersed within the Federal holdings.

The economic importance of the national forests will be realized when it is considered that:

a. The national forests produced a cash income in the fiscal year 1958 of about $91.5 million. Approximately 65 percent of this amount is credited to the general fund in the Federal Treasury (miscellaneous receipts). The remainder is distributed in accordance with special acts of Congress, including 25 percent to the States and

counties in which lands are located. In addition to cash receipts, the non-monetary values of water, recreation, and wildlife on the national forests are estimated to exceed $300,000,000 annually. Water values account for the major portion of this amount, based upon a conservative valuation per acre-foot of water which flowed from the national forests that is used for irrigation, power, municipal water supplies, and industrial use.

b. The area within national forest boundaries is equivalent to some ten percent of the area of the continental United States.

c. The national forests supplied 6.4 billion board feet in fiscal year 1958 to the nation's forest products industries. Dependence of the forest products industries on national forest timber continues to increase as the result of depletion of good quality timber on private lands.

d. About 6,000,000 head of domestic livestock (including calves and lambs) are grazed on national forest lands.

e. The national forests provide protection to municipal water supplies for nearly all western cities and towns and many in the East, to irrigation water used on about 20,000,000 acres of western lands, and to many streams with water power developments. They provide flood protection to thousands of acres of rich valley lands and help to prevent more rapid siltation of reservoirs and stream channels.

f. They provide a habitat for a large part of the big game animal population, for birds, and for millions of small game animals and fur-bearers.

g. They provide opportunities for healthful outdoor recreation, with a minimum of restrictions, for the millions of people who yearly visit the national forests.

h. Nearly 4,000,000 people who live in and near the national forests are supported in whole or in part through the economic development arising through management and utilization of the forests and their resources.

In addition, about 5.0 million acres of land utilization projects are managed under this appropriation item. Revegetation and other development work is done on submarginal land projects in cooperation with local and State agencies. Developed lands are made available to local farmers and ranchers at equitable rates under specific use conditions. Of the revenue amounting to about $2.2 million in fiscal year 1958 relating to these projects, 75 percent goes to the Treasury and 25 percent to the counties in which the lands are located.

The Forest Service, as a part of its regular programs, also directs Federal activities and provides technical guidance to States concerned with the prevention and control of fires which might be caused by an enemy attack in rural areas of the United States.

Selected Examples of Recent Progress:

Receipts:

The following table summarizes cash receipts for fiscal years 1957 and 1958:

National Forests	1957	1958	Change, 1958 compared with 1957
Timber	$106,872,791	$86,274,611	-$20,598,180
Grazing	2,682,349	3,013,930	+331,581
Land Use, Power, etc. ...	2,033,454	2,257,279	+223,825
Subtotal	111,588,594	91,545,820	-20,042,774
Land Utilization Projects..	1,734,666	2,290,775	+556,109
Total Receipts	113,323,260	93,836,595	-19,486,665
Above amounts include:			
Suspense account, Alaska1/	(531,930)	(267,915)	(-264,015)
Suspense account, O&C Lands2/	(3,561,732)	(2,572,117)	(-989,615)

1/ Suspense account established pending settlement of Indian rights on Tongass Forest, Alaska.

2/ Special account established for certain lands in Oregon.

Net area of lands under Forest Service administration changed from 181,068,121 acres as of June 30, 1957, to 181,087,762 acres as of June 30, 1958. This is exclusive of about 5.0 million acres of land administered under Title III of the Bankhead-Jones Farm Tenant Act.

Timber Sales Administration and Management

The volume and value of timber cut in fiscal year 1958 declined from the all-time high of 1957. This is a reflection of the decline in production and demand of timber products during the past two years.

Comparison of Timber Cut in Recent Years

Fiscal Year	Thousand Board Feet	Average Stumpage Value per Thousand Board Feet	Receipts
1950	3,502,000	$ 8.77	$30,269,202
1957	6,974,000	16.57	106,872,791
1958	6,420,000	14.67	86,274,611

The volume of timber sold (placed under contract to be cut) in fiscal year 1958 totaled 13.29 billion board feet including one 50-year sale of 5.25 billion board feet in Alaska.

Allowable Cut Task Force--The volume of timber which can be cut annually from the national forests under sustained yield is of great importance. The Forest Service, the lumber industry, and the general public all are interested in this determination.

A task force was selected to study the problem of determining allowable cut on national forest working circles. The task force, in its technical report, recommends: (1) simplification and standardization in methods of calculating allowable cut; (2) increased research in growth and yield of managed forests; and (3) certain changes in forest inventory procedures needed to obtain better management data.

The work of this committee will result in greater efficiency and in more realistic estimates of present production and future yields of timber from national forest working circles.

Reforestation and Timber Stand Improvement Accomplishment - Fiscal Year 1958

	Treated Acreage (by fund sources)		
	Forest Land Management (appropriation)	Sale Area Betterment (collections) 1/	Total
Planted and seeded (including site preparation)	26,483	62,502	88,985
Measures to obtain natural regeneration (scarifying, controlled burning, rodent control, animal control)	20,039	40,788	60,827
Plantation release	31,650	10,752	42,402
Weeding, thinning, and cull tree treatment in natural stands	49,785	435,126	484,911
Pruning and crop tree release	3,829	144,510	148,339
Animal control (fence construction, etc., use of repellents for game animals, etc.)	123,333	93,966	217,299
Rodent control (including porcupines)	162,649	89,847	252,496
Disease control incidental to reproduction (except blister rust control funds)	41,897	36,758	78,655

1/ These are funds collected from timber sale operators for betterment of the sale area as authorized under Section 3 of the Act of June 9, 1930 (16 U.S.C. 576b).

Recreation-Public Use

Reports from field offices show almost 61 million recreation visits or 80 million man-days' use of the national forests in 1957, not counting the large number of sightseers who came primarily to enjoy the restful forest scenery. This 16 percent increase over the previous year's use was substantially higher than expected as the average annual increase between 1946 and 1957 was 11-1/2 percent.

There are 5,600 improved recreation sites on the national forests. These have over 45,600 family units and a capacity of over 300,000 persons at one time. Supplementing these public sites are 200 winter sports areas at which concessioners operate the lifts and tows. Also some 530 resorts, 770 organization camps operated by concessioners, and 18,500 summer homes and other recreational uses add to the recreation facilities available on national-forest land. These developments accounted for almost 9 million visits in 1957.

Operation Outdoors, the five-year recreation program, was an important contributing factor to the enjoyment of the national forests for outdoor recreation. Increased funds appropriated in fiscal year 1958 made it possible to do a complete job of cleanup, policing, and maintenance at the 5,600 recreation areas. Almost 700 camp and picnic grounds were expanded, and slightly over 200 new ones developed. Some 560 of the 3,425 recreation areas needing major repair were completely rehabilitated during the first year of the Operation Outdoors program.

New developments have not kept pace with the rapidly expanding use. Overcrowding continued in camp and picnic grounds last year. Plans are currently being made for further expansion and development of new sites to relieve the congestion and to improve sanitation conditions where needed.

Wildlife Habitat Management

Hunter and fishermen visits to the national forests in 1957 were 16 percent over 1956, and 227 percent above 1947. This is six times the nationwide rate of increase in hunting and fishing license sales. The growing importance of the national forests as public hunting and fishing areas is shown by the following:

Fiscal Year	Nationwide Hunting and Fishing License Sales	Percent Increase Since 1947	National Forest Hunter and Fishermen Visits	Percent Increase Since 1947
1947	24,687,000	0	4,944,000	0
1949	28,237,000	10	7,161,000	45
1951	28,688,000	16	7,755,000	56
1953	32,485,000	31	9,965,000	101
1955	33,046,000	34	12,342,000	149
1956	33,164,000	34	13,935,000	181
1957	34,195,000	38	16,168,000	227

Increased appropriations in fiscal years 1957 and 1958 permitted the Forest Service to employ a few wildlife technicians. These wildlife specialists are the key men in providing leadership and training that will provide more effective measures to maintain and develop a productive wildlife habitat.

Coordination of Wildlife Needs with other Resource Management.--The Forest Service through its timber management program manipulates the vegetation--wildlife food and cover--on more than 2 million acres each year. Increased attention is given to the use of timber sales, plantations, and timber stand improvement work as a tool to provide a practical low-cost way to improve wildlife habitat conditions.

On-the-job training in methods and techniques for coordinating wildlife needs with all other national-forest uses has been intensified. Wildlife management plans that provide for the coordination of wildlife work with other forest management activities have been completed for about 70 percent of all forests.

Cooperation with States in Wildlife Management.--New cooperative agreements were entered into with Nebraska and South Dakota. Several new fishing lakes were completed or are under construction on the national forests by the various states. In addition, habitat improvement projects, and water developments involving several thousand acres of national-forest land, were completed in cooperation with the states.

Basic State-Forest Service wildlife management responsibilities and policies and mutual problems have been reviewed at meetings between the Forest Service and the Executive Committee of the International Association of Game, Fish, and Conservation Commissioners. The State administrators reaffirmed their position that the Forest Service should be more active in the development and management of habitat improvement on the national forests in cooperation with the states.

Range Resource Management

There were 27,136 grazing permits issued in calendar year 1957 for livestock under paid and exempt permit. In addition, 1,929 private land and 869 crossing permits were issued. During the year the following numbers of livestock were permitted to graze on the national forests:

1,108,579 cattle and horses for 5,524,985 animal months

2,623,106 sheep and goats for 7,291,000 animal months

Permits are issued for adult animals only. Offspring under 6 months of age are allowed to graze without additional charge. The total number of domestic animals allowed to graze--permitted stock plus the offspring--is about 6 million.

Grazing fees are calculated each year by a formula in which the average price per hundred pounds paid to producers in the western states for beef and lambs is used. The average prices are determined by the Agricultural Marketing Service. The average grazing fees per animal for 1958 are five cents higher for cattle and three-fourths cent higher for sheep than for 1957 as shown by the following table:

1957	Cattle 34¢	Sheep 9¢
1958	Cattle 39¢	Sheep 9.75¢

The grazing receipts from the national-forest lands were $3,013,332 in fiscal year 1958, as compared to $2,682,349 in fiscal year 1957.

Steady progress has been made in the analysis of national-forest range allotments to determine their condition and trend, and to prepare improvement management plans for their use. A total of 3,061 allotment analyses have been completed, or approximately 35 percent of the 8,790 grazing allotments. In addition to the numbers completed, there are many in the various stages of completion.

Range Revegetation

In fiscal year 1958, approximately 120,000 acres of depleted range land were treated either by seeding or the removal of competing vegetation. A total of 587,000 acres of national-forest range land has been treated by one or both of these methods during the fiscal years 1951 through 1958. There remain about 5,780,000 acres of range lands within the national forests which are in a depleted condition and need to be treated.

The Forest Service Equipment Development Center at Arcadia, California, through the cooperative efforts of the Forest Service, Bureau of Land Management, Bureau of Indian Affairs, Soil Conservation Service, and other agencies, has developed revegetation equipment which is adapted to use on wild lands. This has been done through field testing and altering commercially developed equipment to withstand the severe conditions to which it is put. Two pieces of equipment which have proved very satisfactory in revegetation of Federal range lands have been the brushland plow and the range land drill. The cooperative efforts to improve and develop equipment suitable for revegetating range lands are continuing. Efforts are now being made to develop a brush cutter, browse seeder, contour trencher, and chemical spray equipment which will have a practical use on wild lands.

Range Improvements

Proper control of livestock movements through fencing and the development of watering places is one of the more important measures used to obtain better range management. During fiscal year 1958, appropriated funds were used to the extent possible for maintenance of existing improvements and, in addition, for the construction of:

439 Mi. Fences

5 Mi. Driveways

479 (Ea.) Water Developments

Permittees continued to cooperate in terms of money, labor, and materials, in carrying out this program.

Soil and Water Management

Municipal Watersheds.--Pursuant to a cooperative agreement with the Forest Service, and under its technical supervision, the City of Bradford, Pennsylvania has removed stumpage valued at $40,000 from the city-owned municipal watershed adjacent to the Allegheny National Forest. As this initial venture resulted in no adverse effects on the quality of the water supply the city intends to continue logging on a sustained yield basis. In a watershed adjacent to the drainage area from which Ashland, Oregon obtains its municipal water supply, logging will be done in 1958. This is a test area in the Rogue River National Forest in which will be observed what effects on water quality, if any, result from the strict timber operating standards which are proposed to be used in a few years in logging the virgin timber in the municipal watershed.

Soil Vegetation Surveys.--Substantial progress was made in developing regional pilot programs to appraise the value of soil vegetation

surveys in managing the national forests and to develop methods adapted to the requirements of wild land management. Pilot areas were extended from two to nine of the ten forest regions.

Watershed Rehabilitation.--Work done specifically to improve watershed and restore damaged, eroding lands was extended from 55 projects on 43 national forests the previous year to 90 projects on 65 national forests. The 3-year program on the Castlerock unit, San Isabel National Forest, Colorado, was completed. Gully plugs, contour trenches, gully stabilization, grass seeding, and shrub planting have visibly reduced runoff. Meadow bottomlands have been restored and Castlerock Creek, which formerly ran a peak flow after each rain and then dried up, is now a stabilized stream supporting fish. In the Intermountain Region the Provo Peak watershed restoration project in which Utah County and the cities of Provo and Springville are cooperating to bring about better protection from floods, got well underway. The project includes some 11 miles of very steep Wasatch Mountain crest lands which slope directly into highly developed industrial, residential and agricultural areas. In Oregon steady progress has been made in sand dune control on the Siuslaw National Forest. New procedures are being developed to reduce the costs of sand dune stabilization, involving new plant species and methods of application.

Effects of Management on Streamflow.--The program to evaluate the effects of national-forest resource management practices on streamflow initiated in 1956 on the Beaver Creek watershed, Coconino National Forest, Arizona, has been expanded to include work in three major vegetative types. The work on this watershed, located in a region of critical water shortages, is a joint effort of the administration and research branches of the Forest Service cooperating with the State of Arizona and the Arizona Water Resources Committee. It is concerned principally with the manipulation of range and timber resources by standard methods and modifications which are considered likely to induce increased water yields. These efforts to produce more water are carefully balanced against other uses of the forest resources. A cooperative program between Los Angeles County, California, and the administrative and research branches of the Forest Service is underway with immediate attention given to treatment and removal of vegetation along water courses for increased water yield.

About 100 crest gages to record peak streamflow were installed on the national forests in Montana and Idaho. These gages, which provide actual measurements of stream height at flood stages, will furnish data needed in location of roads and trails and determining proper size of culverts and bridges. Data obtained also will be useful in observing what effects the methods of resource utilization have on the runoff peaks.

Mining Claims, Mineral Permits, and Leases

Steady progress has continued in the determination of surface rights of mining claims under the Act of July 23, 1955, as shown by the following summary:

Surface Right Determination - Act of July 23, 1955

Progress to June 30, 1958

	Number of Areas	Acres	Estimated Number of Mining Claims
Surface right determination to be done (Revised estimate)	1,000	90,000,000	1,000,000
Field examination during 1958 ...	161	19,576,500	181,900
Total field examinations completed to 6/30/58	263	29,600,000	298,000
150-day publication period expired	166	17,100,000	217,000
Determination job complete	40	4,500,000	25,000

Over 7,300 mining claims have been included on verified statements under the determination of surface rights procedure. These claims are now being examined or scheduled for examination by the technical mineral examiners to determine their validity.

Most acquired national-forest land is not open to location and entry under the general mining laws. Mineral permits and leases are issued for this land by the Bureau of Land Management with the consent of the Forest Service.

On national-forest lands derived from the public domain, permits to prospect for or remove oil, oil shale, gas, coal, potassium, sodium, and phosphate are issued by the Bureau of Land Management under the Mineral Leasing Act of 1920, provided the Forest Service determines that serious adverse effects on watershed and other surface values will not result. Special conditions are inserted in leases to protect such values. Important decisions are made by Forest Service field people in these cases as to whether or not mineral development is in the public interest.

Miscellaneous Land Uses

About 36,500 special use permits of all types now in effect cover over 100 different purposes. Included are permits for pastures, sawmills, television transmitters, roads, and many other desirable uses of the public lands. This does not include some 20,500 permits authorizing recreational uses such as resorts, ski lifts, organization sites, etc., which are reported under Recreation.

Special use permits are issued to individuals, local government agencies, nonprofit groups, and commercial organizations.

Permits of a nonprofit nature are issued free or for a nominal charge. For commercial use the fee is based on the value of the land for that purpose. When a commercial opportunity is offered and a competitive interest is likely, the permittee is selected by competitive bidding on the amount that will be paid annually above a stated minimum fee. Careful administration of special uses is necessary to prevent damage to other important national-forest values. Fees for special land uses totaled $1,143,837 in 1958.

The special use activity is increasing with increased population pressure and the needs of an expanding economy. The increased use of national-forest lands for radio, television, and microwave sites, which increased 50 percent since 1955, is illustrative of the demand for national-forest lands for commercial purposes. Major highways, hydroelectric projects, and other developments in the national forests often require removal of existing permitted uses and cause difficult adjustment problems.

Mapping

Good progress was made in fiscal year 1958 in extending the map and aerial photographic coverage of the national forests which is needed for the protection, development, and multiple-use management of their lands and resources. Planning maps of 22,797 square miles and standard topographic maps of 407 square miles of national forest and boundary areas were completed and contracts were awarded for aerial photography of 38,000 square miles.

Land Exchange

Congress has passed about 90 laws authorizing the exchange of national forest land and timber for private or state lands intermingled with or adjacent to the national forest. The objectives of these laws are to promote consolidation of the national forests for more effective land and water conservation and more efficient management. In 1958, emphasis was placed on the exchange of scattered or isolated parcels to facilitate needed modification of national forest boundaries, to

reduce the mileage and cost of property line surveys necessary, and to simplify national forest administration. During fiscal year 1958, 69 exchange transactions were approved. In these transactions, 36,194 acres will be granted to the Government and 30,353 acres will be conveyed by the Government. These exchanges will block in national-forest lands and will help to consolidate or build up private properties or State conservation units. One transaction is an exchange of national forest timber for 3,775 acres intermingled with national-forest lands.

In addition to the above exchanges, some 2,779 acres of national-forest land within the Mark Twain National Forest, Missouri, were interchanged for 2,784 acres of military lands in Fort Leonard Wood Military Reservation under the Act of July 20, 1956 (70 Stat. 656). Purpose was to achieve more effective use and management of the public lands involved.

Management of Land Utilization Projects

As of June 30, 1958 the Forest Service had responsibility for administering, in accordance with provisions of Title III of the Bankhead-Jones Farm Tenant Act, about 6.9 million acres of Federal land in 76 separate projects. By Executive Order No. 10,787, signed by the President November 6, 1958, all or parts of 12 projects totaling approximately 2.2 million acres were transferred to the Department of the Interior, leaving under Forest Service administration about 4.7 million acres. Under the Department's policy for disposal and management of Bankhead-Jones Act lands, agreements of sale have been executed with two States for two projects totaling about 134 thousand acres. Two other such sales are currently under consideration.

Of the 4.7 million acres now administered by the Forest Service 4.2 million acres are primarily grazing lands. During calendar year 1958 some 235,800 head of livestock were grazed on these lands. Timber production is the principal use on about 1/2 million acres, from which approximately 37 million board-feet of timber and timber products were harvested during the year ending June 30, 1958. Other permitted uses of these lands include operation of recreation areas; limited amounts of cropping, haying and grass seed harvesting, under agreements and permits issued by the Forest Service; and operation under mineral leases and permits handled by the Bureau of Land Management of the Department of the Interior.

During fiscal year 1958, 7 land exchanges were approved involving Bankhead-Jones Act lands, to promote better consolidation of ownership and so facilitate management and conservation activities. In these the Government will convey 3,502 acres and will receive 2,900 acres.

Forest Fire Control

Fire hazards and fire risks in the national forests continue to increase because of greatly expanded timber harvesting, increased water demands, plus more recreation and other uses of the forests. Successful fire control requires effective prevention, detection, and suppression. Continually rising costs of manpower, equipment, and supplies cause the 1958 protection dollar to buy only one-third of what it would fifteen years ago. Conversely, values have increased dramatically in watersheds and timberlands. Structures and improvements of all kinds in and adjacent to forest lands are vulnerable to fire. These many values justify public demand for a strong fire control effort.

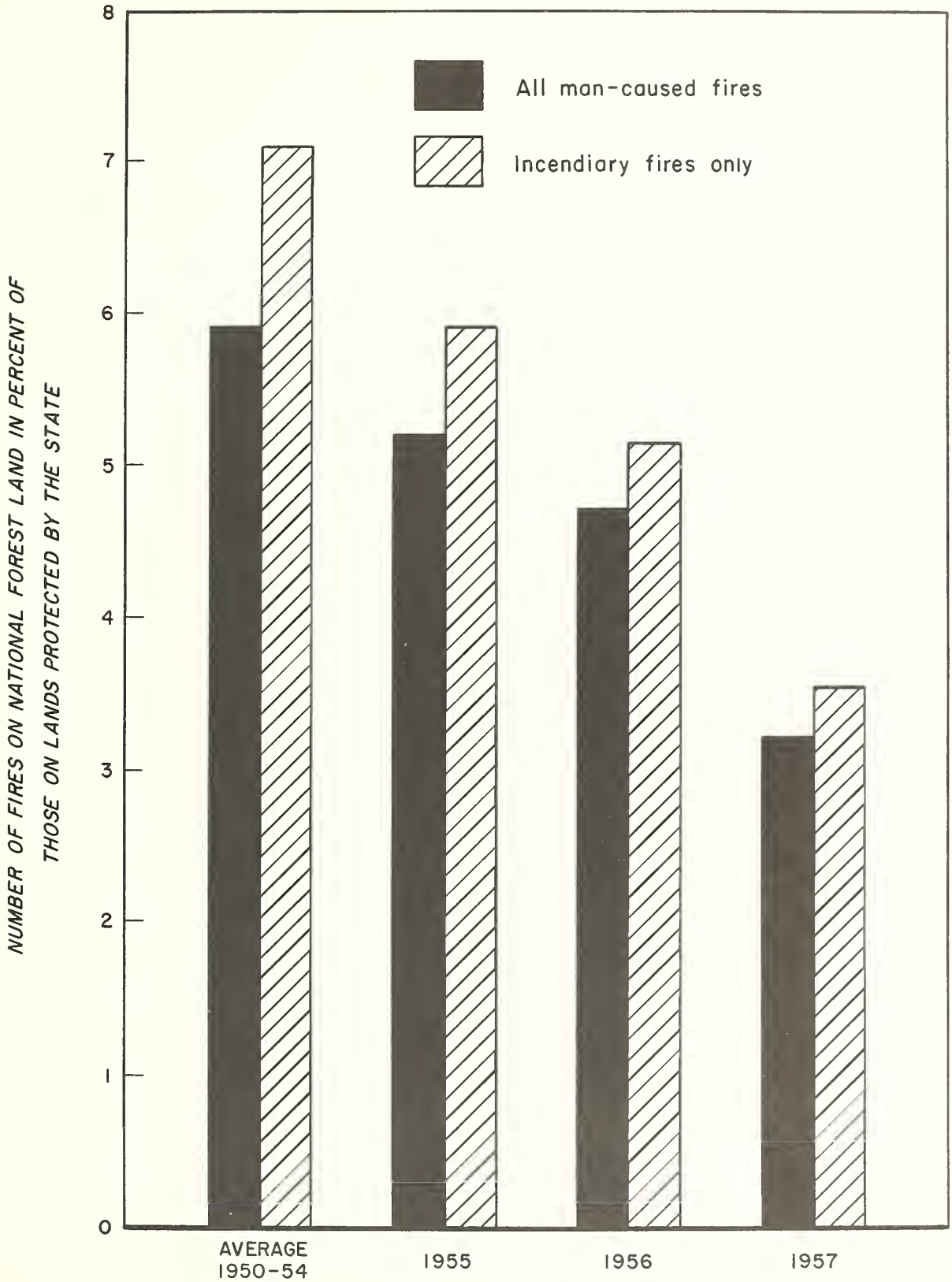
The Forest Service is continually seeking new and better ways of handling fire control work. Fifty-six equipment development projects this past year were directed at more and better mechanized fire control. They included equipment for air attack with helicopters, accessories for aerial tankers using "wet" water and other fire retardants, new equipment to improve smokejumper attack and safety, and better cargo dropping facilities. Studies were continued on fire line building with many types of power equipment.

Significant progress was made in several administrative studies aimed at longtime benefits. An increased manning experiment started in 1955 on eight national forests in five regions showed further encouraging results. On the Mississippi national forests, annual fire control funds were increased by $78,000, mainly for fire prevention. Results show an average net saving of $80,000 annually in the three years of the program. Figure I illustrates results in reducing man-caused fires on the forest as compared to state protected lands. Stronger prevention efforts are needed on other forests.

There was no loss of life among fire control personnel in 1957. Since 1936 there have been sixteen tragedy fires on national forests in which seventy-nine men lost their lives by burning. A 1957 task force of fire experts assigned to study this problem recommended several things that might be done to reduce chances of men being trapped and burned while fighting forest fires. They noted particularly the need for increasing knowledge of fire behavior. A pamphlet "Safe Practices Under Blowup Conditions" was issued and is now widely used in training field personnel. Field units have given special training to crew bosses and other fire line leaders. Advanced courses in fire behavior were conducted on a national basis. Ten standard fire fighting orders were developed. All personnel with fire control responsibilities are required to know these orders. Four new fire control training films are being prepared. Better career opportunities for fire control personnel are being developed.

Figure I. Results of Prevention Effort – Increased Manning Experiment

Mississippi National Forests



Fire danger rating is measuring the variable factors that cause fires to start and spread. Nearly every section of the country now uses a different system to determine fire danger. A uniform nationwide rating system is needed.

A committee of Forest Service fire control and research men agreed that a servicewide fire danger rating system was practical, and recommended a man be assigned full time to develop the method. This man is now on the job.

The 1957 Fire Season

The fire season throughout the Nation varied greatly from what was considered the most favorable in history in the Southern States to above average severity in California and Alaska. The Rocky Mountain Region reported a favorable season along with portions of Utah and Wyoming. However, parts of Idaho and Nevada were rated critical. In the Pacific Northwest, the Southwestern, the Northern, and the North Central Regions, the season was below average severity. Fire conditions in the Eastern Region were about normal.

The 3,305 man-caused fires in 1957 were the fewest in the national forests since 1933, yet recreation use was almost six times what it was in 1933. There were 7,200 fires from all causes in 1957 compared to the previous five-year average of 10,996, or a reduction of 35%. One hundred thirty-three thousand four hundred forty-seven acres burned in national-forest protective areas in 1957 compared to the average for the previous five years of 250,131, or a reduction of 47%.

Construction and Maintenance of Structural Improvements

Funds for this purpose cover structural improvements and communication systems for general administrative purposes including fire control and timber sales under the national forest protection and management activity.

Maintenance of these improvements is based on a relative priority selection of the most urgent projects within classes of improvements, such as lookouts, housing, storage facilities, offices, telephone lines, radio systems, etc.

Construction funds have been used to meet urgent needs for replacement or betterment of existing facilities and for urgent additions. Priority has been given to construction of dwellings and barracks to house employees in localities where suitable

private rentals are not available. The $2,000,000 increase for construction of structural improvements in fiscal year 1958 provided for construction and betterment of the following:

Number of Units (by Fund Sources)

Type of Dwelling	Construction			Betterment		
	National Forest Protection and Management Activity	All Other Funds	Total	National Forest Protection and Management Activity	All Other Funds	Total
Dwellings and Barracks	141	29	170	109	29	138
Fire Lookouts	44	-	44	15	-	15
Service and Storage Buildings - All Types	63	25	88	65	17	82

The $3,280,000 increase for construction of improvements in fiscal year 1959 made it possible to program (from the national forest protection and management activity) the construction of about 200 new housing units plus urgently needed service buildings, fire control structures, additions to communication systems, and betterment of present structures in all classes.

The $25,000 limitation ($30,000 in Alaska) on purchase, erection, or alteration of buildings was removed in the fiscal year 1959 appropriation act and this will be of material assistance in meeting building needs in an orderly manner. However, buildings costing more than $25,000 will be held to a minimum and every effort is being made to hold costs of all buildings to the lowest feasible level.

Fighting Forest Fires

Current Activities: This program covers fire fighting on the national forests and the build-up of emergency fire fighting forces under peak burning conditions. Experience has demonstrated that material savings are made by having a strong force ready to discover, and to attack and stop fast-spreading fires while they are small. Expenditures for the regular fire control organization are financed from the activity "National Forest Protection and Management." The temporary build-up in force when fire conditions are critical and the suppression of fires is financed from the "Fighting Forest Fires" fund.

Significant Fire Control Facts - 1957.

1. Air tanker use quadrupled in 1957 compared to 1956. Changes in equipment design and use occurred almost weekly with this new fire-fighting tool. The three types of retardant currently used in air tankers are water, "wet" water and sodium calcium borate mixed with water. Air tanker attack has proved effective for holding small fires until ground crews arrive, and on larger fires for tactical air support for ground forces.

   Figure II shows how air support was used in helping ground crews control the Morris fire on the Angeles National Forest in California. Air tankers did an excellent job when assigned tasks within their capabilities. The drops made on lines 4 - 4a, 6, 8, and 11 resulted in saving thousands of acres of watershed valued at millions of dollars.

2. Use of helicopters in fire control is increasing rapidly as better equipment is developed and more machines become available. Helicopters were used 2,481 hours on fire control in 1957 compared to 1,950 hours in 1956. They were used to transport men for fast initial attack, scout fires, drop fire retardants, lay fire hose over rugged terrain, transport supplies and perform many other duties. A new turbo-jet helicopter claims improved performance, and is being given extensive field tests during the summer of 1958.

   A helicopter initial attack program is being installed on the Selway-Bitterroot area in Montana for trial during the 1958 fire season. Similar experimental units are being planned for other areas including one for the Black Hills National Forest in South Dakota.

3. The Southern California forests experienced another severe fire season in 1957. While they had only 164 fires, weather conditions were often extreme. Damages were estimated at $26,723,000 or ninety-six percent of the damage on all lands protected by the Forest Service in the Nation. In F.Y. 1958 thirty-five percent of the Protection and Management funds for fire protection, and a large share of the "Fighting Forest Fire" funds available nationally were used for fire control in California.

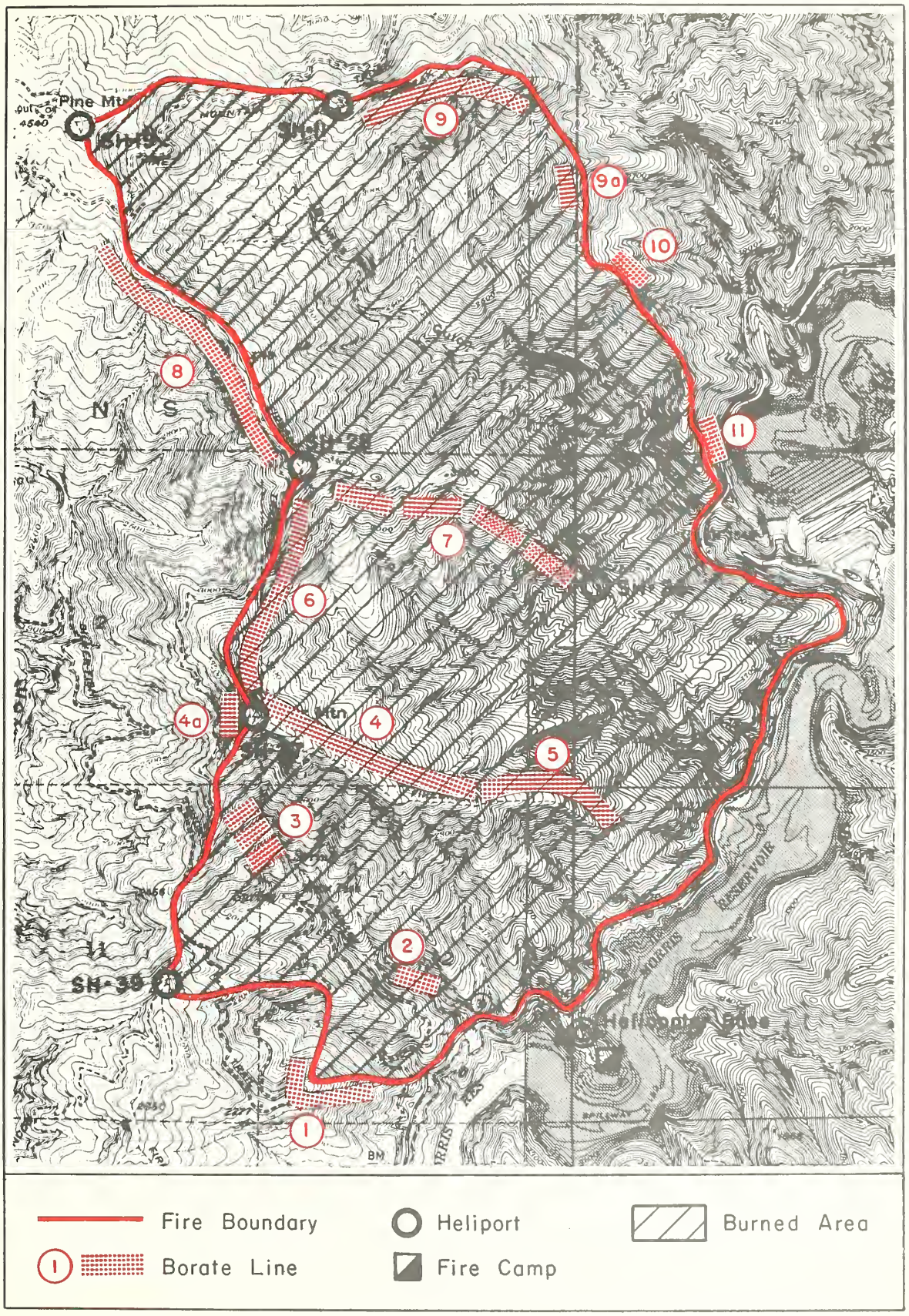
4. The average size fire nationally was reduced twenty-five percent below the average for the previous five years, or from 24.8 to 18.5 acres. While for the Nation as a whole the 1957 season was not severe, credit for the good record is also due to increased emphasis on strong initial attack and more use of mechanized equipment, particularly aircraft.

5. The likelihood of fires starting increases as the use of the forests increase. Recreation use in 1957 was 61,000,000 visitors, or a 17% increase over 1956. Fire prevention effort must be increased proportionately along with more effective detection and suppression to meet this added risk.

6. The National Timber Resource Review shows timber production from the national forests must be doubled by the year 2000 if the Nation is to meet its increasing needs for wood. More woods workers, machines and roads will be required to harvest the timber. Increased industrial activity and inflammable logging debris in which fires can start and spread rapidly, compound the fire control problem.

FIGURE II – MORRIS FIRE AREA AND BORATE RETARDANT LINES

ANGELES NATIONAL FOREST, CALIFORNIA



Insect and Disease Control

Current Activities: The Lea Act, approved April 26, 1940, and the Forest Pest Control Act, approved June 25, 1947, were enacted in recognition of national concern and Federal acceptance of shared responsibility in protecting the Nation's forest resources from destructive insects and diseases. The Lea Act specifically authorizes control of the white pine blister rust disease, while the Forest Pest Control Act authorizes control of insects and other tree diseases. Responsibility for administering these Acts is vested in the Secretary of Agriculture. The Secretary has delegated this responsibility to the Chief, Forest Service. It includes detecting forest insect or disease outbreaks and evaluating their biological significance, providing leadership and cooperation in the control of outbreaks on non-Federal lands, protecting national forests through prevention and suppression of destructive outbreaks, and cooperating with other Federal agencies responsible for control activities in forest lands under their jurisdiction.

Native insects and diseases are held in check most of the time by parasites, predators, diseases and weather conditions adverse to their development. Occasionally something happens to upset this biotic balance allowing a destructive insect or disease to develop into epidemics, which kill and damage much timber. Another cause of epidemics is the accidental introduction of insects or diseases from abroad. Such insects or diseases may be and have been especially destructive because predators, parasites and diseases affecting them in their native habitat are absent in the new one. Regardless of cause, suppression measures are often necessary to stem epidemics and restore biotic balances.

Applying suppression measures effectively requires (1) early discovery and evaluation of outbreaks, (2) pre-suppression work to determine acreage or number of trees to be treated, land ownership, values at stake, costs and economic justification, (3) preparation of a specific plan for suppression.. either by cultural measures such as logging or by direct measures, or both, and (4) prompt application of available suppression measures at the stage in their development when the insect or disease is most vulnerable.

The most economical way to reduce losses caused by insects and diseases is (1) by preventative action through use of forest management practices designed to create and maintain conditions unfavorable for pest development, and (2) by promptly suppressing dangerous outbreaks while they are small. Hence continued emphasis is being given to prevention and to prompt suppressive action. This is being achieved by (1) training programs aimed at resource managers, (2) organizing stronger field units to provide the leadership required for cooperative action on non-Federal lands, (3) strengthening and supplementing detection surveys with observations made by forest workers, (4) clarifying administrative procedures necessary to process control project proposals made by field units of both the Forest Service and States.

Selected Examples of Recent Progress

White Pine Blister Rust Control

Status of Control Program

Region	Total Acres in Control Program	Acres Where Rust Is Controlled		Acres Where Rust Is Not Controlled	
		Acres	Per-cent	Acres	Per-Cent
East:					
Eastern white pine	21,129,271	17,605,878	83.3	3,523,393	16.7
West:					
Western white pine	1,140,600	372,850	32.7	767,750	67.3
Sugar pine	853,426	268,642	31.5	584,784	68.5
Subtotal West	1,994,026	641,492	32.2	1,352,534	67.8
TOTAL, U.S.	23,123,297	18,247,370	78.9	4,875,927	21.1

The job of establishing rust control is not as near completion as acreage summaries indicate. The 1.3 million acres in the West needing more treatment to establish control (67.8 percent of total western control area) are several times more expensive to treat than eastern white pine lands. For this reason and because the rust situation in North Idaho, Oregon and northern California remains critical, about 75 percent of available funds are spent in western regions.

During 1957:

1. Initial work was done on ..... 113,144 acres
2. Rework was done on..... 409,993 "
3. Maintenance work was done on..... 94,736 "
4. Ribes destroyed totaled..... 15 million bushes
5. Survey work to determine pine stocking and ribes regeneration was done on..... 2.3 million acres
6. Killing infection was removed from 35,000 trees to salvage them for thei aesthetic or crop tree value.

7. Fifty-nine camps were established and operated in the West and 2,000 seasonal workers employed. In addition 576 contracts for control work were awarded on a competitive basis.

8. States, counties, towns and private landowners contributed $743,000 for work on State and private land - an increase of $18,000 over 1956 and $31,000 over 1955.

9. Control work was started in Grand Teton National Park to protect specimen limber pine growing along the Snake River at important view points developed under the Park Service Mission 66 Program.

Insects and Diseases Other Than Blister Rust:

Detection and Appraisal Surveys

Forest Diseases

Cone rust reduces seed production. In south Georgia and north Florida 18% of the 1957 cones on slash pine were killed by a rust that has its alternate stage on oak leaves. On individual trees all cones were killed. Longleaf pine was also heavily hit in parts of Florida. Research is underway on control of cone rust with fungicides.

Dwarfmistletoes common in northern Rocky Mountains. Western larch is generally heavily infected in 64% of the stands where it occurs on the Coeur d'Alene National Forest in Idaho and in 70% of the stands on the Kootenai National Forest in Montana. In both forests Douglas-fir and lodgepole pines are also commonly infected. Losses from dwarfmistletoes can be reduced by proper silvicultural treatment during and after harvest cuts.

Ponderosa pine needle blight widespread in Arizona. Aerial surveys indicate that this disease, at present of unknown cause, occurs on about 270,000 acres in widely scattered locations in Arizona. The blight is less conspicuous but more widespread than in 1956.

No recorded spread of oak wilt into new areas. Surveys in eastern and southern States in 1957 did not reveal any oak wilt infections outside of the previously known general infection area. In addition, control programs in several eastern States have resulted in a marked reduction in the number of new infections in 1957.

Oak wilt infection centers in pure oak type in the Lake States with no control spread radially about 4 feet per year. New centers become established at the rate of 1.7 per 100 acres of oak type annually.

Unexplained mortality of red oaks in New York and Pennsylvania continued at an excessive rate in 1957 with indications that only those trees weakened in previous years were dying. The cause of the dying is not clearly understood but adverse climatic conditions are thought to be involved.

Forest Insects

Voluntary reporting by cooperators on occurrences of insect outbreaks increases effectiveness of detection surveys nation-wide. Public and private foresters gave freely of their time during the year to report on the discovery of damaging insect populations in the forested areas throughout the Nation. Their participation in the cooperative detection surveys resulted in prompt and efficient follow-up of ground inspection by trained technicians to determine the needs for suppressive controls.

Surveys reveal decline of Douglas-fir beetle infestations in western states. With minor exceptions, infestations of Douglas-fir beetle declined to low endemic levels in much of the extensive fir forests of the western states. Outbreaks, however, were found in southern Oregon on the Colville Indian Reservation in Washington; in two areas in California; and in southern Utah and New Mexico. Infested trees are being salvaged in all accessible areas as a measure of control.

Scope and intensity of mountain pine beetle infestations increase in the Rocky Mountains and Pacific Coast states. The mountain pine beetle, a serious pest of several species of pines in the western United States, was found in outbreak proportions in many areas. The scope and severity of infestations was greatest in the lodgepole pine forests in the Intermountain States, in the northern Rockies, the Pacific Northwest, and in California. Large-scale control projects to suppress infestations and prevent additional tree-killing have been undertaken in most outbreak areas.

Populations of southern pine beetle reduced in southeastern states by severe cold. Low winter temperatures during December killed a large percent of southern pine beetle broods in epidemic infestation centers throughout the Southern Appalachian Mountains and elsewhere in the southeastern states. Surveys showed that brood mortality in most areas was sufficient to permit public and private agencies to temporarily suspend large-scale programs for control. The lower winter temperatures did not affect other destructive forest insects in the Appalachian Region nor in epidemic infestation areas in the southern states.

Severe infestations of spruce mites develop in fir forests of Montana and southern Idaho. Severe infestations of spruce mites in the fir forests of Montana and southern Idaho occurred in areas which had been sprayed with DDT for control of the spruce budworm. The damage caused by the mites on some 800,000 acres in the two states is the first to be noted in coniferous forests anywhere in the Nation subsequent to aerial application of DDT sprays. Studies are underway to determine the causes of the mite outbreak and of ways to prevent their recurrence.

Extent of balsam woolly aphid infestations increases in fir stands of Oregon and Washington. The balsam woolly aphid, an insect accidentally introduced into the United States from Europe, was first noted in epidemic proportions on Pacific silver fir and subalpine fir in Oregon and Washington in 1954. Since that time, infestations have spread rapidly and now occur on some 599,000 acres in the two states. Heavy tree-killing is occurring in all epidemic centers and salvage logging has been stepped-up to the extent practicable and feasible in an effort to utilize the dead and dying material prior to deterioration. Efforts are also being made to control the infestations by propagating and liberating parasites and predators from Europe and Japan.

Spruce budworm continues in epidemic proportions in fir forests nationwide. Surveys have revealed that several million acres of susceptible host type from Maine to Washington are infested in varying degrees by the spruce budworm. In Maine, infestations occurred on a total of 2,300,000 acres; in Minnesota, some 660,000 acres were moderately to heavily defoliated; Idaho and Montana, some 3,300,000 acres are infested, and approximately 900,000 acres were severely affected in eastern Oregon.

Occurrence of a virus disease eliminates need for control of Douglas-fir tussock moth in Idaho. An outbreak of Douglas-fir tussock moth on some 10,000 acres of second-growth Douglas-fir in southern Idaho was found to be infected by a polyhedral virus organism. This finding, and knowledge that disease-infected moth populations are short-lived, resulted in the cancellation of planned control by application of DDT sprays.

Lodgepole needleminer continues in epidemic status in Yosemite National Park. This destructive insect continued in epidemic status in Yosemite National Park. Cumulative defoliation of infested trees is now causing tree mortality in some areas and it is feared that the entire lodgepole pine forest will soon be killed. Efforts to develop suitable measures for control are being continued.

Several insect pests affecting pine plantations found in epidemic proportions. Pine plantations throughout many sections of the country were found to be affected by several species of damaging insects. The severity of European pine shoot moth infestations increased materially in the extensive pine plantations in the Lake States and Central States. Two other shoot moth species occurred in abundance in the southern, southeastern, northwestern and Central States regions, and sawflies and weevils were prevalent in large numbers in the Northeast, the South, and in California. In all instances when suitable measures have been developed for control, efforts were made to reduce the epidemic populations.

Other Forest Pest Control Accomplishments during F.Y. 1958

(1) Over 100 outbreaks of destructive bark beetles were controlled that involved the treatment of 326,600 infested trees.

(2) Three large epidemics of defoliating insects, primarily spruce budworm, and numerous small ones totalling 1,720,000 acres were brought under control by aerial application of insecticides.

(3) Many small outbreaks of miscellaneous forest insects, grossing 26,900 acres of forest lands, were checked in the early stages of developing epidemics.

(4) Under cooperative agreement 18 States participated in 36 control projects for the control of forest insects on State and privately-owned lands.

The following table summarizes accomplishments:

Control of Forest Insects - F.Y. 1958

Land Ownership	Bark Beetles (Trees treated)	Defoliators (Acres treated)	Miscellaneous Forest Insects (Acres treated)
National Forest and other Federal	312,000	1,624,000	11,300
State and Privately owned	14,600	96,000	15,600
Total	326,600	1,720,000	26,900

In addition to the above, an estimated 1.2 billion board feet of infested, dead, down and susceptible timber were logged by commercial sales to control and avoid insect epidemics as a first defense against forest pests.

Oak Wilt Control

Oak wilt is a disease seriously threatening the commercial oak forests in the East and Midwest. During 1957, Pennsylvania, West Virginia, Virginia, North Carolina and Kentucky applied for and received Federal financial aid to carry out State managed oak wilt control projects on non-Federal land. The Forest Service conducted surveys and necessary control on national forests in Virginia and West Virginia. A total of 4,082 diseased trees were treated at 1,432 infection centers. An estimated 10 million acres were searched from the air to locate these infection centers.

To date Federal participation in oak wilt control has been confined to the eastern and southern perimeter of infected areas to keep the disease from spreading farther east and south. Results are encouraging.

The following table summarizes Pest Control funds expended in fiscal year 1958, and estimates for fiscal years 1959 and 1960.

Obligations, Forest Pest Act Control Projects

Fiscal Year 1958, and Estimates for Fiscal Years 1959 and 1960

Projects	1958	1959 (estimated)	1960 (estimated) 1/
Bark Beetles			
Montana-Northern Idaho	$130,600	$135,960	$125,000
Colorado-Wyoming-South Dakota	72,532	88,290	60,000
Southern-Southeastern States	217,975	233,000	280,000
Utah-Nevada-Southern Idaho	450,168	1,031,500	220,000
California	115,105	87,000	100,000
Arizona-New Mexico	16,000	- -	60,000
Defoliators, such as Spruce Budworm			
Arizona-New Mexico	83,341	55,000	40,000
Montana-Northern Idaho	236,000	39,500	28,000
Utah-Southwest Idaho	50,000	255,000	20,000
Michigan-Wisconsin	2,500	20,000	- -
Oregon-Washington	509,535	65,000	20,000
Maine	42,296	5,000	- -
Forest Tree Diseases			
Eastern States-Oak Wilt	46,500	77,000	80,000
Mistletoe Surveys	15,014	15,000	20,000
Miscellaneous Forest Service Projects and Pre-control work 2/	513,940	397,550	740,000
Department of Interior Insect and Disease Projects	177,636	132,000	117,000
Subtotal, Control Projects	2,679,142	2,636,800	1,910,000
Detection and Appraisal Surveys	723,078	718,100	718,100
Unobligated balance	8,880	- -	- -
Total available or estimated	3,411,100	3,354,900	2,628,100

1/ Estimates of project needs are forecast a year or more in advance of anticipated use. They are subject to fluctuations and adjustments are required between projects depending on new outbreaks that occur and expanded needs on going projects.

2/ This item provides funds for administration of the Forest Pest Control Act, continuous pre-control activities, and for quick action on many projects across the Nation to stop outbreaks while they are small. Involved are cone and seed insects, wood borers, weevils, spittlebugs, tip moths, shoot moths, aphids, sawflies, bark beetles, budworm, scale insects, and other forest insects and diseases.

DEPARTMENT OF THE INTERIOR

Insect and Disease Control Projects

Prevention of serious losses from diseases and insects in the forests under the jurisdiction of the Department of the Interior is an important activity under the Forest Pest Control program. Approximately 185 million acres of forests and woodlands are administered by the Department of the Interior, including 7 million acres by the National Park Service, 1 million acres by the Bureau of Sport Fisheries and Wildlife, 16 million acres by the Bureau of Indian Affairs, 36 million acres by the Bureau of Land Management in the continental United States and 125 million by that Bureau in Alaska.

White Pine Blister Rust Control

The objective of the White Pine Blister Rust Control program is to protect the valuable white pine forests from the ravages of the white pine blister rust, a fungous disease of foreign origin. There are 577,167 acres of control area administered by the Department of the Interior, of which 376,239 are under the direction of the National Park Service, 58,963 under the Bureau of Land Management, and 141,965 under the Bureau of Indian Affairs.

In the calendar year 1957, the National Park Service, the Bureau of Land Management, and the Bureau of Indian Affairs collectively destroyed 1,402,356 ribes on 34,722 acres, of which 8,257 were initially worked and 26,465 reworked. Of the total control area 439,707 acres or 76 percent is on a maintenance basis.

The National Park Service has stepped-up control work in parks located in the Northern Rocky Mountains to secure early protection from the advancing disease. Several of the Rocky Mountain parks, including Glacier, Yellowstone, Grand Teton, and Rocky Mountain, contain outstanding examples of high elevation white pine, such as limber, foxtail and white bark pine. These pioneer programs for the protection of representative samples of these scenically valuable species are well-advanced with approximately 50 percent of the control areas worked initially. Seventy-seven percent of the control area is now on maintenance.

The Bureau of Land Management expects to increase its control area in western Oregon in the near future. Of the total control area over 60 percent is on a maintenance basis.

The Bureau of Indian Affairs continued its control action in the Lake States. Most of the ribes work on the Menominee Reservation is being accomplished by Indian women. Of the total control area, approximately 80 percent is on maintenance.

Control of Insects and Other Diseases

For many years a program to maintain a low level of infestations and infections and to prevent epidemics within the intensively used scenic and recreational areas of the national parks has been successful in conserving

these valuable forests. A number of relatively small but nonetheless important projects are involved in this program. Most of these projects require annual attention to maintain the forests in a healthy condition. Examples of these projects are the bark beetles in the California national parks, the defoliators in the southwestern national parks and monuments, dwarfmistletoe in Grand Canyon National Park, and the oak wilt at Effigy Mounds National Monument. Likewise, there are minor projects of a recurring nature at some of the Indian reservations, examples of which are the walkingstick infestation at the Menominee Indian Reservation and the Black Hills beetle at the Navajo Reservation.

There is a pilot control project of major importance underway in Yosemite National Park against a lodgepole needleminer which is complicated by an inter-related bark beetle infestation. A full scale control program depends upon the results of pilot projects currently underway. Pilot control projects of similar significance but lesser scope are being carried out to develop practical control methods against the white fir needleminer at Bryce Canyon National Park, the Southwestern pine and Ips beetle at Bandelier National Monument and the pinyon bark beetle and pinyon scale at Grand Canyon National Park.

The Bureau of Indian affairs is making a post control check to determine timing of the second general operation for control of dwarfmistletoe on the Mescalero Reservation. Through a survey made to determine the extent of the spread of this parasite it was found to be widespread on the Fort Apache Reservation.

Quite frequently infestations involving the forests of this Department likewise concern adjacent forest areas. The following are examples requiring coordinated control:

Mountain pine beetle outbreak in Grand Teton National Park and the adjacent Grand Teton National Forest.

Spruce budworm on 93,411 acres in Montana where public domain forests are intermingled with private lands and lie adjacent to national forests.

Bark beetle infestation at Bryce Canyon National Park and the adjacent Dixie National Forest.

Southern pine beetle infestation which involves the Cherokee Indian Reservation, Great Smoky Mountains National Park, and the Blue Ridge Parkway, as well as adjacent national forests and private lands.

Mountain pine beetle infestation which involve a total of 45,000 acres of public domain forest lands and state and private forest lands in northern California.

Bark beetle outbreak in sections of Sequoia and Kings Canyon National Parks and adjoining Forest Service, State and private lands in California resulting from the McGee Ranch fire of 1955.

Acquisition of Lands

These funds are used to acquire lands for the protection of the watersheds of navigable streams and for the production of timber under the provisions of the Weeks Law of March 1, 1911, as amended (16 U.S.C. 513-519, 521).

There are now 55 national forest and purchase units situated in 29 states and Puerto Rico, within which acquisition of lands under the above acts has been approved by the National Forest Reservation Commission and in which lands still remain to be acquired. All but a few of these units are east of the Great Plains.

In the fiscal year 1958, 69 tracts containing 7,169 acres were approved for purchase under the Weeks Law. These included 16 Indian allotment tracts containing 785 acres within the Chippewa National Forest in Minnesota. Purchase of these tracts, not suited for habitation and chiefly valuable for forestry purposes, will help consolidate the national forest and at the same time aid the Indians and the Bureau of Indian Affairs in their program of disposing of allotments not useful to the Indians and best adapted to long term forestry projects. It is expected that some additional allotted lands will be offered, but this special program largely has been accomplished. In all, 36,477 acres of these lands have been acquired. The remaining 53 tracts approved in 1958 were parcels needed to meet specific administrative and resource conservation needs, such as assurance of rights-of-way, prevention of damage to adjoining public properties, reduction of fire hazards, reduction of need for property surveys, and protection of publicly owned reservoirs. Purchase of these lands will result in materially increased efficiency and economy in administration of, and increased public benefits from national forest lands. There are many more similar key tracts surrounded in whole or in part by national forest land and most valuable for national forest purposes which need to be acquired.

FOREST RESEARCH

The Forest Service conducts research on problems pertaining to all forest land and on the management of related non-forest rangelands, including State and private holdings as well as national forests and other Federal lands.

The research is carried on primarily at the Forest Products Laboratory, Madison, Wisconsin, at nine regional forest and range experiment stations in the continental United States, and at forest research centers in Alaska and Puerto Rico. Much of the research at the regional stations is concentrated at laboratories and at field research centers including experimental forests and ranges where major problems may be studied advantageously.

The research is to a large extent cooperative with States and private agencies. The following fields of research are under way:

Forest and Range Management Research

Current Activities: Research under this activity is concerned with the growing of timber and the management of forest properties, the management of efficient use of range forage, and the management of both forest and range vegetation to produce the greatest amount of usable water and to minimize erosion.

Research in forest management emphasizes the development of methods for quickly increasing the growth rate of forests and hence the permissible annual cut. Emphasis is given to harvest cutting patterns that promote regeneration of the forest or increase growth and quality of residual stands. Also being stressed are measures leading to control of undesirable vegetation competing with crop trees. Methods of reforesting farm lands withdrawn from cultivation, stripped mining lands, and cut or burned-over forests, are being improved through research. The development of hybrid trees for faster and more certain timber production is being studied, as well as improved methods for stimulating gum flow in pines for the production of resin.

Wildlife habitat and range management research emphasizes development of methods and practices for building up or maintaining forage production on forest and related non-forest ranges, and for its efficient utilization by game and livestock, at maximum levels consistent with other values of land for watershed, recreation, timber production, or other uses. Emphasis is being placed on determination of proper intensities of stocking, systems of grazing, and seasons of use for native ranges, seeded ranges, and ranges on which undesirable plants have been controlled. Studies are also under way on the use of fire in the control of undesirable range plants, and the development of methods for restoring and managing desirable forage plants on game ranges.

Watershed management research is directed toward improving soil and cover conditions and practices to alleviate flood and sediment problems arising out of past land use, and toward helping meet urban,

rural, and industrial demands for water of good supply and high quality. Watershed use problems are attacked by obtaining quantitative measurements of the effects of such activities as fire, logging, grazing, and road construction on water supply and quality. Concurrent with these studies are those to determine how to use watersheds for various economic purposes and still provide satisfactory water supplies. Possibilities of increasing water yield through manipulation of the vegetation are being studied. Particular attention is being given to the effects of watershed use and management on study areas as they are reflected in soil-plant-water relations. This provides both an understanding of the cause and effects of given measures and a means of predicting the magnitude of results from applying watershed use and management measures on other areas.

Selected Examples of Recent Progress

Forest Management Research

Direct seeding. Direct seeding is by far the cheapest and most flexible system of reforestation when it is effective. Rodents and birds have been the biggest obstacles to successful direct seeding. A commercial insecticide, endrin, has been found to make seeds unattractive to rodents. Tests with Douglas fir seed in the Northwest and pines in the South show that seeds treated with endrin are not eaten by rodents in amounts comparable to untreated seeds. In the South, birds also hinder direct seeding. However, a coating of arasan or anthraquinone repels the birds. This treatment plus endrin has made possible the extensive sowing of seed from airplanes with very satisfactory results.

Seed source important. The development of hybrid forest trees and the selection of individuals superior in growth rate, form, or resistance to pests or adverse environmental conditions is of importance in all forest regions but particularly so in the South, West, and Lake States. The need for selecting seed from the proper origin for a particular planting site is becoming more and more evident. Data are now becoming available from a test of seed sources of the southern pine involving 37 cooperators in 16 States. In Arkansas a seven year test of elevational strains of loblolly pine shows that trees grown from seed collected at elevations within a range of 200-400 feet of the planting site elevation survived best and grew the most. The poorest trees came from sources 100 feet or more lower in elevation. In another test of loblolly pine races in New Jersey, the fastest growing trees were from a North Carolina source and the slowest were from a Louisiana source.

Disc-harrowing proves most economical method for natural regeneration. On the South Carolina Coastal Plain three alternative methods of site preparation gave the following average costs in a mature loblolly pine stand on which all but seed trees had been removed:

Method	Cost per Acre
Disc-harrowing	$3.51
Prescribed summer fires	10.88
Prescribed winter fires with summer chemical foliage spray	17.98

In addition to being the most economical method, disc-harrowing resulted in a larger number of seedlings per acre than the alternate methods tested.

Regeneration of lodgepole pine. A survey of lodgepole pine clearcut areas in the Blue Mountains of Oregon showed that time of cutting and size and shape of cut areas are important in the management of lodgepole pine. Long, narrow clearcut areas surrounded by lodgepole pine favor regeneration to lodgepole pine. Other species are favored by large circular cut areas. Slash burning is not recommended because it creates a seedbed highly favorable for lodgepole pine and increases the probability of overstocking.

Hormones increase tree growth. Plant growth regulators hold promise of hastening the growth of selected trees, or perhaps of plantations. Gibberellic acid is a growth substance with this potential. Applications of this chemical to seedlings of eastern cottonwood, sycamore, yellow poplar, sweetgum, cherrybark oak, willow oak, and southern red oak increased their growth 75 to 350 percent. White oak, white pine, Arizona cypress, and water oak showed much less or no response.

Releasing young pines by air. White pines in New England and shortleaf pines in Missouri which had been overtopped by low grade hardwoods, were released by aerial spraying. Helicopters were found to be especially effective in applying the spray, a mixture of 2, 4, 5-T, and oil.

Red alder improves soil. Red alder shows promise in the Pacific Northwest as a soil improving species. At the Wind River Experimental Forest where red alder has been interplanted with Douglas-fir, the nitrogen content in the soil and in Douglas-fir foliage has been increased 50 and 6 percent, respectively, over the nitrogen contents of soil and foliage from areas where red alder was not interplanted. Presence of alder also has stimulated the growth of older dominant Douglas-fir during the past seven years.

Thinning ponderosa pine. In the Black Hills an over-dense stand of ponderosa pine was practically worthless at 63 years of age, containing only one-fourth cord of merchantable wood per acre, all in very small trees. By comparison, plots thinned to 4 x 4 feet at 30 years had 1.5 cords at 63 years, and plots thinned to 10.3 x 10.3 feet had 16 cords.

Growth of cottonwood and willow. Management of cottonwood and willow in the Mississippi "Delta" is very promising. Yields of 50 cords per acre are possible in 15 years for cottonwood and 25 years for willow. Thinning should start when the trees reach pulpwood size, and should remove only enough trees to create crown openings that will close in 3 to 5 years. Heavier thinnings encourage branching from dormant buds and wind damage. Where open-grown cottonwood is pruned, however, the wounds heal very quickly. Even under management, stands of both species start to deteriorate at about 50 years.

Predicting site quality from soil conditions. The estimation of site productivity from various soil characteristics was made possible by studies in several sections of the country. For example, site quality for quaking aspen on relatively level upland areas in northern Minnesota can be predicted from the following soil properties: (1) percent of silt and clay in the upper 36 inches of soil, (2) acidity of the subsoil, and (3) percent of stones in the upper 36 inches of soil. In other topographic locations, site index is influenced by depth of water table, position on slope, and aspect.

Efficient method for sampling timber stand volumes. Point sampling, as contrasted with sampling by plots, is a new method for estimating the volume in stands of timber. The efficiency of this new technique is shown by a comparison made by survey crews in Texas. For the same tracts of timber there was only 1.1 percent difference in the estimated volume by the two methods. Although more points than plots are needed to establish the same degree of accuracy, the survey crew needed to tally only a quarter as many trees in the point sample method. Moreover, only one man is needed usually for a point sample whereas 2 or more often make up a plot sampling crew.

Wildlife Habitat and Range Management Research

Forage yields increased by brush conversion. In California conversion of woodland brush to grass resulted in 130 percent more animal days of grazing per acre, a 47 percent longer grazing season, and a 55 percent increase in weight gain per animal. Wildlife habitat values were also enhanced, and the openings created in the brush will facilitate fire control. The following procedure was developed for converting both chamise and woodland brush to grass: (1) select a site with gentle slopes and good soil; (2) crush brush with a bulldozer and remove by safe burning using area ignition; (3) drill suitable forage species; (4) spray with 2,4-D to kill brush seedlings and sprouts; and (5) graze conservatively to promote vigorous growth and assure a good soil cover.

Heavy grazing reduces production of herbage and flower stalks. On pine-brushgrass range in Colorado, grasses and sedges maintained or increased their yield during the past 16 years under light and moderate grazing, whereas yield on heavily grazed range was reduced by more than half. Production in 1942, at the beginning, and 1957 was as follows:

Grazing Intensity	Herbage (pounds per acre)	
	1942	1957
Light (10 to 20% removal)	317	335
Moderate (30 to 40% removal)	361	446
Heavy (more than 50% removal)	351	148

In 1957 the valuable grasses, Arizona fescue, and mountain muhly averaged only 2.3 flower stalks per plant under heavy grazing but 7.4 and 11.8 per plant under moderate and light grazing, respectively.

Calf gains related to grazing intensity. During the past 3 summers, calves on forest range in eastern Oregon gained 202 pounds under a light intensity of grazing, 194 pounds under moderate, but only 180 pounds under heavy grazing. With conservative grazing, then, gains amounted to more than 1.6 pounds per day for a 4-month season. Approximately 80 percent of this gain was made during the first half of the grazing season, mid-June through mid-August, when the forage was green and most nutritious.

Quality of range forage in the Southeast. In southern Georgia grasses comprised about 85 percent of the yearlong cattle diet; however, supplements high in protein and energy are needed most of the year to compensate for the low quality forage on wiregrass range. Browse plants were generally higher in protein than grasses, particularly during the winter, but the low energy value and high lignin content decreased their quality. In south Florida burning caused temporary increases in protein and phosphorus content of forage and decreases in lignin. However, protein remained adequate for only 11 weeks and phosphorus for only 3 weeks following burning. Calcium was never at an adequate level. Both calcium and phosphorus, then, must be supplied yearlong and protein must be supplied for about 9 months to supplement native forage and maintain beef cattle in good condition.

Hardwood control increases forage values. In Louisiana eradication of undesirable hardwoods increased grass production from 675 pounds to 2,415 pounds per acre. Crude protein and phosphorus content was consistently higher in forage from plots where hardwoods were controlled than from untreated areas, and these nutrients stayed above the minimum cattle requirements much later in the season. Similarly, controlling low-grade hardwoods with herbicides in the Missouri Ozarks increased forage production of grasses and legumes from 219 to 1,213 pounds per acre.

Insect damage to range plants. Observations in the Northwest indicate that in some localities insects may destroy more vegetation than is consumed by livestock and big game combined; however, information about insects associated with forage plants, particularly browse, is virtually nonexistent. Exploratory studies in Oregon involving insect collections on bitterbrush and associated plants established the identity of 80 species of insects representing 45 families. Tent caterpillars, which cause severe damage to bitterbrush, were often parasitized by other insects.

Rodent-range relations. Five years after seeding, grass stands on Utah ranges produced 1,290 pounds per acre on areas where gophers were controlled, but only 112 pounds per acre where gophers were not controlled. In Colorado the gopher population was reduced 87 percent on a grass-forb range as a result of vegetation changes following spraying with 2, 4-D. Spraying caused a 37 percent increase in grass, but a 70 percent reduction in forbs, the preferred food of gophers.

Big-game habitats improved by artificial revegetation. On winter deer range in Utah, 475 trial plantings were made of 85 species of shrubs and weeds. Antelope bitterbrush and fourwing saltbush appeared to be the most satisfactory species; however, cliffrose, big sagebrush, rubber rabbitbrush, and curl leaf mountain mahogany also showed considerable promise. In both Utah and Idaho tests showed that endrin, in combination with fungicides, was over 95 percent effective in protecting planted bitterbrush seed from mice depredations. In California over 12,000 bitterbrush seedlings per acre were established on an 18-acre pilot area of deteriorated deer winter range using the new methods of seeding and protecting seed from mice.

Combined livestock-big game use may have severe impacts on range vegetation. Preliminary studies of overgrazed deer-sheep ranges in south-central Utah indicate that weeds and shrubs selected by deer are likewise used by sheep. This combined use has depleted the weeds, palatable browse, and bluegrass, resulting in a range type dominated by low-value shrubs and coarse grasses. Exploratory work in southern Oregon has indicated that deer and livestock utilize about 65 percent of the highly palatable bitterbrush, and deer alone utilize as much as 30 percent. Bitterbrush reproduction is abundant under deer use only, but very scarce under season-long grazing by both deer and livestock. On grass-forb range in Wyoming during the period 1953-56, grass yield increased 135 pounds per acre where protected from game and livestock and 75 pounds where only livestock were excluded.

Watershed Management Research

Alpine snowfields gain moisture from the air. Storage of water in alpine snowfields for later summer streamflow appears from studies of condensation and evaporation to be even more efficient and effective than has been previously recognized. Plastic tanks were placed in alpine snowfields and filled with a weighed amount of snow. Melt water was caught and weighed and it was found that in the month of August 1957 more water was deposited as a result of condensation of moisture in the air than was lost from the snow by evaporation. In spite of the fact that the maximum rate of evaporation per hour was nearly twice as high as the maximum hourly rate of condensation, a net gain of 1300 gallons per acre per day was realized during this late summer period when measurements were taken.

Artificial barriers tested to extend snowfields. Possibilities appear promising for increasing the size and depth of snowdrifts in high elevation alpine areas of the western mountains and thereby extending the late season streamflow, by erecting artificial barriers in strategic locations. Whereas strong winds normally move snowfall long distances, barriers aid in the accumulation of snow in deep drifts permitting slow summer melting. In Utah a snowdrift formed behind a 16 x 60-foot slat snowdrifting fence measured 15 feet in depth, while the average undrifted snow depth was only 8 feet.

Deep soils are most effective in soil-water storage. In the mountains of southern California, studies indicate that water yields from soils less than 4 feet deep would be about the same whether covered by brush, pine, or grass. On soils deeper than 4 feet, water yield might be increased if cover were converted from trees or brush to grass, provided rainfall is sufficient to wet the soil below this depth and if the growth of deep-rooted herbs is prevented. This would indicate that watershed management practices for increased water yield must be limited to deep soil areas with sufficient water storage capacities to yield the additional water left by the shallow-rooted vegetation.

Land use affects snow accumulation, soil freezing, and infiltration capacity of soils. In studies of frost occurrence made from Maine to Pennsylvania, concrete (solid) frost was observed twice as often on open land as on forest land and about twice as often in conifer stands as in hardwood stands. Also, the frost penetrated to twice the depth on open land as on forest land. Such frost rendered all soils impermeable to water except under the forest where rodent burrows and root tunnels allowed water to enter the soil. Snow accumulation in the Lake States was also affected by land use. Accumulation was most rapid in open areas and under aspen and less rapid under conifers. Pattern of cutting also affected snow accumulation and melt. Strips running east-west caught more snow in this area and retained it longer than any other pattern of cutting.

Studies of water-loving salt cedar point to its control. Gains in knowledge of requirements for the establishment of seedlings of tamarisk (salt cedar) and the elimination of conditions meeting those requirements may lead to reductions in the salt cedar stands and decreases in the amount of water they consume. Seeds are produced almost continuously from April to September and may be widely dispersed by wind and water. However, seeds germinate only in water, on continuously wet soil, or in 100 percent humidity on moist surfaces. Germination is rapid but establishment is slow and seedlings can be killed by drought or by floating them loose with high water. Seedlings will not develop when air temperatures are less than 82° F. Control of one or more of these factors may prevent seedling establishment. The next step will be to alter the vegetation to include species having lower water use requirements.

Skyline crane system of logging reduces soil disturbance. In the search for a method of logging steep mountain terrain with a minimum of soil disturbance the Wyssen skyline crane was compared with a ground skidding tractor operation in north-central Washington. The Wyssen crane operation disturbed the soil to any degree on only 5.0 percent of the logged area whereas the tractor operation caused disturbance to 21.6 percent of the area, 15.1 percent of which was deep disturbance of 1 inch or more. The Wyssen or similar system appears to have many advantages in protecting the watershed.

Vegetative cover used to restore control of surface runoff and soil erosion. Runoff and erosion vary inversely and infiltration rates vary directly with amount of plant and litter cover. Similarly, sediment carried by the overland flow of water is inversely related to ground cover. Sediment collected in the Morris Creek weir pond in northern Utah shows that this steep, but heavily vegetated small watershed has an annual sedimentation rate of only 0.0014 acre-foot per square mile, while the sedimentation rate for a less steep barren plot was 2.174 acre-feet per square mile, or 1600 times greater.

Forest Protection Research (Fire, Insects, Diseases)

Current Activities: This work includes projects concerned with research on the control or prevention of damage by fires, insects, and diseases in forests.

Research on the protection of forest, range, and watershed lands from fire is directed toward reducing losses from fire, better efficiency in application of fire control measures, and toward learning how to use fire beneficially in the management of forests and related range lands. The possibilities of reducing the large number of man-caused fires by improved fire prevention methods are under study. Explorations on reducing the severity of fire-setting lightning storms are being continued. Special attention is also being given to understanding the unexpected behavior of large fires, and to improving methods of attack through the use of airplanes, helicopters, and other devices. Special study is being given to conditions for using fire for hazard reduction, and for control or modification of vegetal cover.

Research on forest insects is directed toward the prevention or control of destructive insect attack on forests and forest products. Damage by insects enters into all phases of forest management from the seed to the mature forest. The development of effective and economical methods of direct and indirect control is dependent upon thorough knowledge of life histories and habits of forest insects, including the interrelationships between the insects and their environments. Investigations on direct control methods involve mechanical and chemical methods. Research on improvement of insect survey methods with particular emphasis on use of aerial photographs is an important phase of the work. Control of forest insects by indirect methods such as the use of natural or introduced

predators and diseases of insects, and by silvicultural practices designed to prevent the buildup of insect epidemics, offers promise and is being emphasized in the research program.

Research on diseases in forests, forest tree nurseries, and on decays and stains of forest products provides the basic information on the causes of diseases and on practicable and effective methods of combating them. Studies are underway on the identification and life history of the pathogens that cause disease, on the environmental conditions that result in disease epidemics in forests, on direct control by chemical and mechanical methods, on indirect control through silvicultural practices and genetic resistance, and on the improvement of disease survey techniques. In the products field, research is directed to the determination of methods of handling logs and lumber to prevent fungus infection; of the proper use of naturally durable or treated wood in high-hazard locations; and of improved structural design to reduce decay of wood in service.

Selected Examples of Recent Progress

Forest Fire Research

More help to fire fighters from the air. Conferences and field demonstrations have helped to spread the use of new techniques for using fixed- and rotary-wing aircraft to increase the striking power of fire fighting forces. These new uses originating in California have been extended on either an operational or test basis to the Northwest, Southwest, and Intermountain regions and to parts of the South. Most spectacular has been dropping of bulk water or chemicals from airplanes directly on fires. Helicopter accessories have been developed to do the same. Helicopter techniques are also being rapidly developed for such things as quick delivery of specially equipped fire fighters to fires in difficult terrain and laying long hose lines over dense cover and rugged topography. Though fire fighters are enthusiastic wherever aircraft have been used for these purposes, much research and development is still necessary before the full potential of either airplanes or helicopters for speeding up control of forest fires can be realized.

Lightning fire study. Project Skyfire, the cooperative study of fire-setting lightning storms, continued at a high level of activity in Montana. Reports on this project were prepared at the end of the year for use by the Advisory Committee on Weather Control in its final report to the President. Though the summer's operations were concerned chiefly with development of effective cloud seeding techniques, there was evidence that the growth of young cumulus clouds could be interrupted by cloud seeding. This gives promise of preventing their development to the lightning producing stage. Operational tests of cloud seeding to reduce lightning in California appeared favorable.

Forest fire laboratories. Two forest fire laboratories planned for the long-term national forest fire research program will soon aid

researchers in developing new and improved methods of forest fire control. One at Macon, Georgia is being constructed by the State of Georgia as part of its cooperative fire research program with the Forest Service. Known as the Southern Forest Fire Laboratory, this unit will operate as part of the Southeastern Forest Experiment Station. The other, at Missoula, Montana, is being financed by Federal appropriation. This, the Northern Forest Fire Laboratory, will be part of the Intermountain Forest and Range Experiment Station. Both laboratories are designed with specialized facilities for fire model studies and other basic research into the many unknowns about forest fires.

A national system of fire danger rating. Day-to-day changes in the danger of forest fires are highly important to forest fire agencies. Systems for rating the danger of fires have been in use for approximately 20 years. As dependence on such systems has increased through the years, the need to improve their accuracy has also increased. Eight systems are currently in use by the Forest Service, each developed locally to fit the special requirements of a distinctive forest region. This has merit, but the existing lack of comparability in results obtained by the different systems seriously limits their potential usefulness. A new project has recently been initiated to establish a common basis for all fire danger rating and to develop as far as possible a single national system which can be adapted to varying local situations.

Weather surveys for prescribed burning. Quantitative correlations between fire behavior and environment can be valuable aids to fire control activities. For example, brush burning for range improvement in California sometimes does not accomplish the desired results because of the uncertainties in the local weather and fire behavior. Research in cooperation with the California Division of Forestry has found that by making intensive weather surveys in an area for several days prior to burning, much of this uncertainty can be removed. By properly evaluating the weather and fitting the timing and method of firing to the surveyed conditions both better and safer burning can be attained.

Fire danger in interior Alaska. Department of the Interior's Bureau of Land Management has responsibility for protecting the forests of interior Alaska from fire. In 1956, particularly heavy losses resulted from thin-spread protection facilities and an unusually severe summer season. More than 5 million acres burned. The problem is difficult in that it has many aspects without precedent in continental United States. Inspection of the problem by Forest Service fire researchers indicated an immediate need for a fire danger rating system that would indicate to Bureau personnel the current potential fire load. An interim danger rating system has been developed for this purpose pending establishment of a more formal fire research program to meet Alaska's special needs.

Evaluating the results of fire prevention effort. Evaluating the results of forest fire prevention programs has been handicapped in the past by lack of a satisfactory measure of the fire-starting potentials of different combinations of land uses and occupancies. A system for evaluating this fire risk in terms of type and level of human activity, forest type, and current weather has been developed for use on California national forests. These forests can now inventory their fire risks as a basis for strengthening their protection systems.

Forest Insect Research

Woodpeckers are effective in keeping Engelmann spruce beetle infestations in check. Woodpeckers have been found to be effective in checking the rise of Engelmann spruce beetle broods in infested stands. Percentage reduction in beetle populations is far greater in heavily infested trees than in lightly infested ones. The woodpeckers are widely dispersed during the breeding season but they tend to concentrate in beetle infestation areas during the winter.

Parasitic nematodes affect rate of egg-laying by bark beetles. Laboratory studies indicate that bark beetles parasitized by nematodes lay fewer eggs than non-parasitized ones. A nematode, Aphelenchulus sp., was found present in 56 percent of Ips beetles collected from infested pinyon pines in the Southwest.

Natural control factors check outbreak of fir sawfly. Populations of the white fir sawfly at two locations in California are at the lowest levels since the peak of an outbreak 5 years ago. A combination of natural control factors, particularly a polyhedrosis virus, was responsible for the population decline.

Control of the Great Basin tent caterpillar by virus organism. A polyhedrosis virus of this serious pest of aspen in the Southwest was introduced into aspen stands in Arizona and New Mexico in the form of a spray by a mist blower. The virus organisms were found to have lived over winter and to have attacked the caterpillars the following year.

Indirect control of southwestern pine beetles a possibility. Exploratory studies indicate that ponderosa pines highly susceptible to attack by bark beetles in the Southwest can be recognized before they are attacked. These findings suggest that a risk rating might be developed for this tree species in Arizona and New Mexico similar to the one being used with outstanding success in California and Oregon. If so, the destructive beetles might then be controlled by removing susceptible trees from the stands.

White pine weevil controlled by insecticidal sprays. Emulsion sprays of lindane, endrin, heptachlor, and malathion have given excellent control of this destructive weevil when applied to the leaders of

pines in the spring months. Excellent control was also obtained by applying lindane, plus the extender Aroclor 5460, to the leaders of pines during the fall months.

European pine shoot moth control. DDT, at rates of 2, 4, and 8 pounds per 100 gallons of water, gave 98 percent control of the European pine shoot moth when applied experimentally by hydraulic equipment as a heavily wetting spray. Application of 20 pounds of DDT in 40 gallons of water also gave 98 percent control when applied by mist blower.

Malathion spray effective against Virginia pine sawfly. A heavy infestation of this sawfly on Virginia pine in Maryland was controlled experimentally by aerial application of one pound of technical malathion in 2 gallons of oil per acre.

Control of the pine needle sheath miner. Experimental application of a malathion spray during late spring resulted in almost complete control of this pest of hard pines in California. This insect attacks pines after they are about 4 years old and has been known to destroy as much as 75 percent of the needles on a tree.

Oak bark beetle transmits oak wilt fungus. Oak wilt developed in seedlings which were fed upon by several hundred adults of the oak bark beetle under caged conditions. These beetles had emerged in the cages from bolts of wood that had been impregnated under vacuum with the oak wilt fungus. This species of bark beetle has long been considered a likely means of long distance spread of the fungus. Tests are still underway to determine its role in disease spread in the woods.

Effect of season of cutting of Douglas-fir on Douglas-fir beetle. Douglas-fir trees felled during the winter or early spring are much more attractive to Douglas-fir beetles than are those that are felled during the summer. This is an important factor to consider in planning cutting operations. If it is necessary to cut during the winter the logs should be removed promptly from the woods.

Malathion sprays partially effective for control of needleminers. Aerial application of malathion at rates ranging from 1 to 2 pounds in 1 to 20 gallons of oil per acre has resulted in partial control of needleminers in fir and pine. Seventy-five percent control of the fir needleminer was obtained with 1-1/2 pounds of malathion in a gallon of oil per acre. A similar percentage control of the lodgepole pine needleminer required 2 pounds of malathion in 20 gallons of oil per acre.

Improvement in termite control. Foundations around parts of 240 buildings were treated with 13 different chemicals 10 years ago to determine their effectiveness in preventing termite attack. Recent inspection of the buildings showed that 10 percent sodium arsenite in water at

the rate of 1 gallon per 5 linear feet of soil trench has completely protected the buildings from termite attack for the full 10 years.

Several other chemicals also have been found to be effective in preventing subterranean termite damage to wood in contact with treated soil. These chemicals include sodium meta arsenite, benzene hexachloride, chlordane, DDT, toxaphene, aldrin, dieldrin, and heptachlor. All of these chemicals have been under test for at least 5 years, during which time they have been completely effective against termites. A few have been under test much longer, and have been equally effective for 10 years.

Old house borer controlled in buildings. Oil solutions of 5 percent DDT and 0.25 percent dieldrin applied as brush treatments controlled larvae of the old house borer in artificially infested 2x4 pine blocks for 16-18 weeks. Natural infestations of the insect in floor joists and subflooring in several houses in Maryland were also controlled for 4-16 weeks by these solutions; and by others consisting of 2 percent chlordane and 0.5 percent lindane. All solutions were applied at the rate of 1-1/2 pints per cubic foot of wood in ultrasene.

Forest Disease Research

Mortality of ponderosa pine infected with Elytroderma needle blight in Idaho amounted to 16 percent of the trees and 8 percent of the merchantable volume in virgin mature stands over a 7 year period. The figures for mature cutover stands were 11 percent of the trees and 6 percent of the volume. In immature second-growth stands the losses were 25 and 18 percent, respectively. For all stand types combined the loss was 16 percent of the trees and 9 percent of the volume. High risk marking for cutting in diseased stands is recommended.

Inoculations of southern pines with the brown spot fungus showed that the fungus remained on the surface of one-year-old needles with no evidence of penetration, indicating resistance to infection. Extensive tests of control of brown spot in the field included four different fungicides, 26 schedules at 2 different locations, and 1, 2, 3, and 4 applications per year. Encouraging results were obtained in both plantations and natural reproduction.

White pine blister rust studies in Oregon and California demonstrate that the increasing length and intensity of the summer dry period as one proceeds southward on the Pacific Slope reduces the number of periods favorable for blister rust. When a favorable period does occur, however, infection may be heavy and damaging. Most local spread of the rust from infected ribes took place either in a northerly direction or down hill.

Hypoxylon canker rate of infection on aspen in the Lake States varies with time, with a low level occurring during the past year; its prevalence varies with geographic location, and more infection occurs in poorly stocked stands. Several natural infections were found for the first time in North America on European aspen with indications that this species may be as susceptible as the native species. Hypoxylon canker was found on aspen for the first time in Arizona. Not until 1955 when this disease was found in Colorado was it known west of the Great Plains.

Oak wilt mortality in Missouri. Examination in 1957 of 365 red oaks and 95 white oaks in Missouri, naturally infected with oak wilt between 1952 and 1956, showed that 99 percent of the red oaks were dead but only 19 percent of the white oaks were dead, 26 percent were living and displaying symptoms, and 55 percent were living and free of symptoms. Black oak inoculations during each month of the year revealed no periods of immunity but susceptibility was greatest during May, June, and July. There was little difference in the results when different-aged cultures were used, indicating that the fungus retains a high degree of virulence while growing in pure culture for periods up to 10 years.

Decay cull in lodgepole pine. Heartrot was present in 20 percent of 188 lodgepole pines dissected in a pulp-timber stand in Oregon, but only 5 percent of the trees had more than 1 percent of their volume decayed. Total decay amounted to less than 2 percent of the gross cubic volume dissected. Fire scars and dead branch stubs were the most important infection courts.

New work on the littleleaf disease of southern pines clearly demonstrates the parasitism of Phytophthora cinnamomi on new roots and suggests that resistance to littleleaf may be largely a matter of ability to recover from Phytophthora attack rather than resistance to attack. High nitrogen fertilization continues to prevent littleleaf and induce recovery in many cases, especially when used in proper balance with phosphorus and potassium.

Biological control of Fomes annosus root rot. A high degree of natural biological control of root rot was observed in Massachusetts through prior stump infection by the saprophytic fungus, Peniophora gigantea. Conditions favoring such infection are under study.

Resistance to chestnut blight. Over 1,000 scions from large American chestnuts, survivors of the chestnut blight, were received from 30 locations. They have been grafted to rootstocks for further testing of their resistance to the chestnut blight fungus. After five years' exposure there have been no losses from chestnut blight among the Chinese chestnuts planted at Bent Creek, N.C., in a resistance test of five of the best lines.

Black root rot of southern pine seedlings effectively controlled by soil fumigation. Methyl bromide is the best of several fumigants tested, being effective against soil fungi, nematodes, insects, weeds, and weed seeds. This chemical is also highly effective against white pine root rot in Michigan nurseries.

Excessive mortality of sugar maple in Northeastern and Lake States. The cause is unknown but is the subject of research in both areas. In the Northeast two known fungi, Verticillium albo-atrum and Phytophthora cactorum, are present and, along with unfavorable environmental conditions, contribute to the dying. In Wisconsin a progressive dieback of sugar maple tops has been observed for several years. In 1957, however, a rapid dying of trees, from saplings to sawlogs, occurred in localized patches, aggregating about 1,000 acres.

Sweetgum blight. For the first time since blight losses started several years ago improvement was recorded in sweetgum stands in Louisiana and Mississippi. Disease index increased 5 percent in 1956 and only 2 percent in 1957, while mortality dropped from 3 percent to 2 percent. These changes were associated with abundant rainfall in contrast to varying degrees of drought prevailing in previous years. The evidence is now strong that sweetgum blight in the deep South is essentially a response to soil moisture shortages.

Pole blight of western white pine. A soil survey in western white pine pole-size stands, 50 to 100 years old, confirmed previous observations that pole blight does not occur in deep soil with available moisture storage capacities in excess of 5.0 inches. Pole blight occurrence was significantly but inversely correlated with both available moisture storage capacity and underground soil moisture recharge potentials. These two factors account for 70 percent of the variations in pole blight occurrence.

Effectiveness of oak wilt survey methods. Active wilt centers spotted from an airplane in Tennessee accounted for 35 percent of the total found; aerial survey plus ground followup yielded 53 percent; aerial survey plus ground followup plus ground visits to all previously found centers accounted for 86 percent; and the remaining centers were detected by complete ground scouting. In oak wilt control programs aerial detection must be augmented by ground scouting.

New kind of wood decay. In studies of a new type of deterioration (soft rot) in cooling towers, it was found that many organisms, previously considered as non-decayers, are capable of causing serious losses in weight and strength of wood.

Natural durability of wood. Further studies of decay resistance show that Alaska cedar is only moderately resistant under conditions of severest decay hazards but Angelique is highly resistant. In baldcypress the heartwood of many second-growth trees lacks the superior resistance reputed for the species.

Forest Products Utilization Research

Current Activities: The aim of the forest products research program centered at the Forest Products Laboratory and with field projects at the various regional forest and range experiment stations, is to contribute to the solution of national, regional, and local utilization problems of all types; to increase efficiency in harvesting timber crops; to reduce unused woods and mill residues to a minimum by finding uses for present residues; to develop new products; and to improve the serviceability and lower the costs of existing products. Its broad aim, in brief, is to develop new utilization outlets for thinnings, unpopular and little used species of timber, logging and milling residues, and to make the whole timber crop on farms and other forest lands go further and give better service in a wide variety of uses for lumber, paper, chemicals, and other products derived from wood.

Selected Examples of Recent Progress

Forest Products Utilization Research

Book papers from northern hardwoods and Balsam fir. Pilot plant tests show practicability of making book papers from a combination of little-used northern hardwoods and Balsam fir. This process will be used in a new 50-ton commercial mill now under construction in northern Minnesota. This is an important development since it points the way to economical utilization of these species in the Lake States and the Northeast.

Tree quality in southern pine. Progress has been made in developing methods for the appraisal of quality in southern pine. Field work on the development of log and tree grades is well advanced and computations are underway. In addition, studies of specific gravity, a property associated with quality for many uses, have been conducted in Mississippi. These studies indicate that longleaf and slash pine rank highest in specific gravity while shortleaf and loblolly pines were intermediate and appreciably above spruce pine. The specific gravity of all species increased from north to south in Mississippi. In connection with the survey, trees with outstanding specific gravity were marked for study by geneticists working on tree improvement. One tree with extremely high specific gravity was found. These studies are being conducted by the Southern and Southeastern Experiment Stations in cooperation with the Forest Products Laboratory.

Defects in timber detected by gamma rays. In cooperation with Ohio State University basic research has been conducted on the attenuation of gamma rays by wood under varying degrees of moisture content as well as by certain defects common in timber. This work indicates that there is a good possibility of detecting rot and other defects in timber by use of a scintillator especially designed for the purpose. Such a device is now under construction and will be used during the coming year to find out whether or not it can be used to

determine the degree of defect as well as the kind of defect in standing timber. If successful, this device will be useful in estimating cull and quality of trees. The basic data will also be useful for other purposes.

Earthquake-resistant construction. Surveys of damage resulting from earthquakes and hurricanes show that wood structures perform well. As a result engineers and architects have requested the development of more data on the behavior of wood diaphragms so that wood structures can be better engineered. During the past few years the Forest Products Laboratory has developed important criteria for this design. The work was done in cooperation with the State of California, Division of Architects, and the Department of the Army, Corps of Engineers. Preliminary reports have been made to the cooperators and general information has been published in Report No. 209 of the American Society for Testing Materials. It is interesting to note that a large proportion of new school buildings in California are built of wood construction. The large amount of window space required makes it important that walls, ceilings, and floors be designed as structural units to absorb vertical and horizontal forces. This explains the interest of California in developing these data.

Bin pallets for agricultural products. The Forest Service has cooperated with other agencies of the Department in investigating the potential of use of bin pallets for harvesting agricultural products. Report No. 2115, "Bin Pallets for Agricultural Products," has been issued to cover information developed to date on the engineering design of such pallets. A comprehensive project on the harvesting of apples is being conducted under the leadership of Agricultural Marketing Service in the State of Washington. The Forest Service will participate in this work.

Better methods for cutting wood. In an effort to cut down wastage from saw kerf in cutting lumber, other methods of cutting wood are being explored. One of these is the slicing of wood by a conventional veneer slicer. It has been shown that slices up to one-half inch can be cut from timbers of white fir, Douglas fir, and Western red cedar. This veneer can be successfully dried and has been built up into larger pieces by gluing. A lumber company cooperating in this work intends to explore all possible uses of the thick-sliced veneer.

Utilization of hardwoods in southern Illinois and adjoining counties in Indiana, Missouri, and Kentucky. The Central States Station at its Carbondale Research Center has compiled a prospectus for the location of pulp-using industries in the vicinity of southern Illinois. This was a joint undertaking with the Area Services Division of Southern Illinois University with the technical advice of the Forest Products Laboratory.

Fire research using banana stalks. An observing timber products manufacturer called the attention of the Laboratory to the fact that

banana stalks are difficult to burn in an incinerator even when dry. Following this lead, stalks were obtained and dried rapidly and were incinerated, producing about 20 percent ash. This ash contained largely potassium carbonate. Wood impregnated with this material showed pronounced resistance to burning and flame spread. This lead is being followed up with other salts in the hope of obtaining a fire retardant which will resist leaching when exposed to weather.

Use of hardwoods in liner board for corrugated boxes. In the past, very little hardwood pulp has been used in the manufacture of liner board corrugated boxes because of the high strength requirements of this element. A new approach has been developed by the Laboratory using dual head boxes so that a combination of hardwood and softwood pulps can be used to form a liner board to place the stronger softwood pulp on the side of the wall that will be given the more drastic stresses when the board is scarred or subjected to impact blows. For example, a liner board consisting of 48 percent hardwood semi-chemical pulp, 32 percent kraft waste paper, and 20 percent kraft pulp had properties comparable to those of commercial southern pine kraft liner board. One commercial mill is now considering the installation of dual head blocks for the manufacture of liner board. This has potential for extending the use of low grade hardwoods in box construction.

Forest Resources Research

Current Activities: This work includes the nationwide Forest Survey, research relating to the marketing of timber products, and investigations of the economics of timber production.

Forest Survey. The nationwide forest survey provides basic forest resource facts by States or counties on the character and condition of forest land; the volume, quality, and location of standing timber; rates of timber growth and natural losses; the amount and kind of timber cut for forest products; and consumption and prospective requirements for timber products. This information provides a basis for policies and action programs of public forestry agencies, forest industries, landowners, and many others having direct interests in forest resources.

Forest Products Marketing. Research in the marketing of forest products includes studies of possible means of increasing the efficiency of harvesting, grading, selling, and distributing forest products, improved methods for providing price and market information for timber products, and development of expanded markets for timber species and materials in surplus supply. Such marketing investigations are of particular importance to the several million owners of farms and other small forest properties.

Other Economic Research. Investigations of the economic aspects of forestry enterprises provide information on the profitability of producing various timber crops in different areas, the effect of ownership,

taxation, and other economic factors on the practice of forestry, and possible means of reducing financial and economic obstacles to the growing and harvesting of forest crops. These studies thus provide economic guidelines for forest owners and timber industries, and in conjunction with other resource investigations furnish part of the facts needed for development of national and local forestry programs.

Selected Examples of Recent Progress

Forest Survey

Additional 43 million acres surveyed. During the past year initial surveys were completed on 17 million acres in five States, including Alaska, raising the total acreage inventoried at least once to 522 million acres. Areas still requiring initial surveys total 134 million acres, mostly in the Rocky Mountains, plus 122 million acres in Alaska. Resurveys to determine changes in forest conditions, problems, and opportunities were completed on 26 million acres in six States. Results of the survey and related research were released in some 75 publications, articles, and research notes; highlights of some are presented below.

Hardwood volume increasing in North Carolina. A resurvey of North Carolina showed an increase of about one million acres of forest land during 17 years since the initial survey. The volumes of hardwood growing stock and of cull trees each increased about one-third; pine growing stock showed no change but pine sawtimber volume decreased six percent. Although total growth has increased substantially, a disproportionate amount is of species and quality least desired by forest industries. Thus the forest industries in North Carolina face both a surplus of poor timber and local shortages of the kinds of raw material upon which their production is based.

Timber growth in Connecticut greatly exceeds cut. Forest survey results showed that nearly two-thirds of the land in Connecticut is growing timber. Private owners control 92 percent of the two million acres of commercial forest land, more than half of which is in ownerships of less than 100 acres. About 17 percent of the forest land supports sawtimber stands which average 3,200 board feet per acre. The net annual growth of sawtimber is more than five times the volume cut, partly because many forest areas are devoted to watershed protection and recreational use.

Improved survey techniques developed. New procedures for classifying forest productivity and needs for stand improvement were developed and applied in the Florida Forest Survey; modifications are being worked out to adapt the procedure for use in other regions. An improved growth projection method for determining growth outlook is being tested in the Southeast. Aerial photo volume tables based on average stand height, crown diameter, and percent of crown cover were published for

use in Rocky Mountain conifer stands. Improved procedures for using variable plots with special tapes showing limited plot radii and adjustments for slope also were developed for use in areas with dense undergrowth and steep terrain.

Forest Products Marketing Research

Market development possibilities. In the Intermountain and Rocky Mountain Regions studies were carried out to determine opportunities for new or expanded industries based on use of lodgepole pine or other species for which markets are currently limited. The economic feasibility of salvaging sawmill residues for pulp chips was analyzed in the West and South. In South Carolina, for example, ten different procedures for handling residues were investigated to determine the most efficient methods of concentrating, debarking, and chipping residues. Thus where total purchases of mill slabs and edgings exceed 190 cords per day, a central chipping plant at the pulp mill can best be supplemented by satellite chipping plants designed to process at least 25 to 30 cords daily. In cooperation with State agencies, studies of Christmas tree marketing were conducted in Ohio, Washington, and Oregon to determine market preferences, problems, and opportunities for market improvement. The growing of Christmas trees in the East is expanding rapidly, and eastern growers are expected to capture an increasing proportion of the large eastern markets at the expense of western suppliers. Thus in Ohio, only 12 percent of the 1.6 million Christmas trees sold in 1956 were grown locally, whereas more than 3 million potential Christmas trees were planted by Ohio growers during that year.

Improvements in marketing practices possible. A study of lumber marketing practices at small sawmills in Ohio indicated that sale of air dried lumber, rather than green lumber, could increase net returns of small sawmill operators by about 12 dollars per thousand board feet.

Forest Production Economic Research

More pulpwood with less manpower. While the South's pulpwood harvest has been rising, the supply of labor for producing pulpwood has been decreasing markedly. Labor requirements of several pulpwood harvesting systems in various southern timber types were evaluated in Occasional Paper 154 of the Southern Forest Experiment Station. Cost comparisons are presented for three methods of loading and hauling pulpwood in the flatwoods of Arkansas, in the rolling hills of central Mississippi, and in the hardwood bottoms of a Mississippi tributary.

These studies in the South also showed substantial cost advantages for mechanized yards developed by the paper industry to eliminate hand transfer of pulpwood from trucks to rail cars. Unloading labor at woodyards averaged only 0.1 man-hours per cord compared with 0.6 man-hours per cord for pine and 0.8 man-hours for gum by hand transfer at sidings. Truck turn-around time at the yard was 0.1 truck-hours per

cord compared with 0.3 at the siding. Other benefits of the yards are shorter truck turn-arounds, higher loads, and reduced standby time for rail cars. Less-than-carload deliveries commonly made by farmers also find a ready market at woodyards.

Forest taxation and credit needs analyzed. A report, "Forest Taxation: What Can Be Accomplished by Improving and Modifying the Property Tax?" was released indicating how State and local forest taxes can be better adapted to the needs of forest enterprises through improvement and modification of the property tax. A study of "Forest Credit in the United States," in which the Forest Service participated, was published by Resources for the Future, Inc. This report includes recommendations which could lead to more adequate credit arrangements for small ownerships, and suggestions for removing other obstacles to better forest management on small holdings.

STATE AND PRIVATE FORESTRY COOPERATION

Current Activities: This program, for the most part carried on in cooperation with the States, encourages private timber growing through assistance in preventing and suppressing forest fires, reforestation of denuded and poorly stocked areas, and good management of woodlands. Privately owned forest lands comprise three-fourths of the Nation's commercial forest area and produce 90 percent of all timber cut. The fire control program applies to all forest lands within the boundaries of organized protection units. The balance of the program is concentrated on small forest properties in private ownership because (a) more than half of the commercial forest acreage is in small holdings averaging only about 60 acres each, (b) the small-owner group comprises 99 percent of private forest owners, and (c) present cutting practices are poorest on these small properties.

Recent Progress and Trends:

1. Cooperation in forest fire control:

The year 1957 was an excellent one in forest fire control. The weather was exceptionally favorable over most of the Nation, and past years of prevention work appeared to take hold. The public was more careful with fire in the woods. This resulted in a new national record for fewer fires (77,172), and less burned acreage (3,221,386). The northeast was the exception with forest fire conditions so hazardous that the Governors in each of the New England States and New York declared a state of emergency and restricted the use of the woods. Protection was extended to an additional 2.3 million acres which leaves 38.9 million acres of the 434.7 million total or 9 percent without organized protection.

Other examples of recent progress:

(a) During the year the State of Nebraska entered into an agreement for cooperative forest fire protection, making the 45th State in the program.

(b) A study of the cooperative fire control program was made under contract by the Battelle Memorial Institute of Columbus, Ohio. The objective was to determine the justifiable cost of the program and the proportionate sharing of these costs by private, State and Federal agencies. This report is now being studied by the Department.

(c) Special technical services were given to States in equipment development and procurement, administrative workload studies, and fire weather research.

(d) Assistance and technical guidance were provided the States in the development of plans for Rural Fire Defense.

The following table shows State allotments and expenditures for cooperation in forest fire control:

	State and Private Funds Expended, F.Y. 1958	Federal Allotments F.Y. 1959 1/
Alabama	$884,845	$351,400
Arkansas	824,707	269,200
California	12,016,637	1,228,400
Colorado	71,176	32,400
Connecticut	206,153	42,700
Delaware	15,110	15,500
Florida	3,126,599	584,300
Georgia	2,584,519	532,500
Hawaii	17,680	15,000
Idaho	385,815	142,200
Illinois	92,385	45,700
Indiana	152,983	50,000
Iowa	29,668	30,000
Kentucky	377,030	140,500
Louisiana	1,291,131	334,400
Maine	852,430	220,900
Maryland	439,485	100,800
Massachusetts	468,945	116,900
Michigan	2,028,728	428,800
Minnesota	761,326	277,400
Mississippi	1,115,350	308,600
Missouri	670,336	189,500
Montana	251,292	103,300
Nebraska	179	4,600
Nevada	115,951	30,000
New Hampshire	218,045	67,600
New Jersey	373,168	91,000
New Mexico	48,740	30,000
New York	1,033,100	221,500
North Carolina	1,140,159	310,500
North Dakota	6,613	5,000
Ohio	249,543	83,500
Oklahoma	185,410	137,300
Oregon	2,277,126	561,300
Pennsylvania	774,806	169,500
Rhode Island	143,201	32,700
South Carolina	1,177,322	269,200
South Dakota	36,057	30,000
Tennessee	859,655	240,100
Texas	628,460	236,800
Utah	50,423	34,900
Vermont	101,576	30,000
Virginia	799,693	243,300
Washington	2,243,175	566,800
West Virginia	308,605	122,700
Wisconsin	1,392,228	331,300
Administration, Inspection, Prevention, and Special Services to States	- -	675,000
Grand totals	42,827,565	10,085,000

1/ While the amount available to a State may, if the allotment is small, exceed previous expenditures by that State, the actual payment to a State never exceeds State and private funds expended by or under the control of the State.

2. Cooperation in forest tree planting:

The program to furnish forest tree planting stock to State and private landowners under Section 4 of the Clarke-McNary Act advanced at a record rate last year. In fiscal year 1957 the program output was 712 million plants, an increase of 25 percent from the previous year and 525 percent above that of 1950. This record production is the result of enormous expansion in the state nurseries, especially in the South, and the expansion goes on to such an extent that a program output of at least a billion plants annually is expected within another two years. There are now 45 States plus Hawaii and Puerto Rico in the program and the steps necessary to bring Nevada into it will soon be completed.

The Federal share of the financing for this program in fiscal year 1958 was $1,308,000, an increase from the $1,000,000 of the previous year. The contributions of the States and private landowners increased $1,306,000 at the same time.

In spite of increasing wages paid nursery laborers the production costs for the program's trees have been held down by further developments in nursery techniques and efficiencies made possible by increased output. In 1958, the production cost was $8.29 per thousand trees. This cost is the third lowest on record. The average posted sale price was $5.33 per thousand. The State Foresters distributing these trees reported that the 891 million trees involved in 1958 were sent out in nearly 96,500 individual orders. Of these, about 92,000, or 95 percent of the total, went to farmers and other owners of small forested tracts.

3. Cooperative forest management and processing:

In fiscal year 1958, Colorado entered the cooperative program. Farmers and other small owners now are receiving technical forest management assistance in about 1,500 counties in 45 States and Puerto Rico. About 1,000 counties with small woodlands, however, are still without this service.

The number of "service" or "farm foresters" increased from 314 in 1957 to around 400 in 1958. In fiscal year 1957, the 314 foresters assisted 44,494 small owners to do better management on 3,086,143 acres of woodland. These owners received $11,896,026 from the sale of over 538 million board feet of forest products harvested. In addition, 203,932 acres of young timber were saved from premature harvest. In 1957 over 5,500 small processors of forest products were assisted.

This cooperative program continued to strengthen the private forestry profession by referring 766 woodland owners, with about 463,443 acres, to private consulting foresters who charged a fee for their technical services.

The Federal Government's share in this cooperative endeavor aimed at 4-1/2 million small owners and some 50,000 small forest products processors, was $1,000,000 in fiscal year 1957. The States spent an additional $1,503,299. In 1958 the Federal share was raised to $1,510,000 and the States are increasing their contributions.

4. General forestry assistance:

The Forest Service continued to provide technical forest management assistance to other Federal, State, community, and private agencies and to the Congress, forest industries, colleges, forest consultants, and landowners. Some of this assistance is in highly specialized management and inventory problems and is provided by a few specialists working out of Forest Service regional offices and in close coordination with the state foresters. Particular attention is given to the 73 counties that are classed as "pilot" or are in "trade areas" in which there are large areas of "rural underemployment." An analysis of these counties shows that more than 1/2 of their area is forest land. New forest industries are being encouraged in rural areas which have a surplus of both farm labor and timber volumes. For example, in January 1958, in a 7-county area in southwest Virginia, a study was made of the possibilities of marketing 16 million board feet of sawtimber and 300,000 cords of timber available annually for new and expanded industrial utilization.

Other examples of recent cooperative management progress:

(a) Training schools were held in the regions to give Federal, State, industrial, and consultant foresters and forest school professors information on the latest techniques of log grading, utilization, forest management, and the newly developed "continuous forest inventory" techniques using cards marked in the forest but read and tabulated by automatic machines.

(b) Technical assistance was given to the Armed Services--chiefly the Navy now that the Army has its own foresters--in putting their forested lands under good management.

(b) Forest Roads and Trails

Appropriation Act, 1959 and base for 1960	$26,000,000
Budget Estimate, 1960	24,000,000
Decrease (in funds required to liquidate obligations incurred under contract authorizations)	-2,000,000

This appropriation provides for the liquidation of obligations for the construction and maintenance of forest roads and trails incurred pursuant to the authorization contained in the Federal Highway Acts of 1956 and 1958. Roads and trails are essential to protection and management of national forests and utilization of their resources. An appropriation of $24,000,000 for 1960 will provide sufficient cash to liquidate obligations which must be paid by June 30, 1960.

Analysis of Cash Requirements by Activities a/

	Actual 1958	Estimated 1959	Estimated 1960	Increase or Decrease
Construction of roads and trails	$13,538,369	$29,139,000	$16,949,000	-$12,190,000
Maintenance of roads and trails	7,352,566	7,819,000	7,051,000	-768,000
Total	20,890,935	36,958,000	24,000,000	-12,958,000

Authorizations for Appropriations a/

Fiscal Year	Construction	Maintenance	Total Funded	Total Unfunded
1958	$19,500,000	$7,500,000	$24,336,000	$2,664,000
1959	24,500,000	7,500,000	26,000,000	6,000,000
1960	22,500,000	7,500,000	24,000,000	6,000,000
Total	66,500,000	22,500,000	74,336,000	14,664,000

a/ The annual appropriation language and the Budget presentation combine the appropriation for "Forest roads and trails" made pursuant to 23 U.S.C. 205 and the appropriation of 10% of forest receipts for construction and maintenance of road and trails pursuant to 16 U.S.C. 501. This merger of funds is made in order to simplify the programming, allotment, and accounting of funds at the field level. Since the accounts for these two funds are merged it is not practicable to distribute obligations and expenditures between the two appropriations on a precise basis. The amounts shown for the "Forest roads and trails" appropriation are a pro-ration based on the percentage that contract authorization used under the appropriated funds is of total available funds. Expenditure amounts for maintenance are based on all such obligations requiring cash payment during the fiscal year in which obligations are incurred.

Status of Unfunded Authorizations

Unfunded contract authorizations through 1959	$34,664,000
Appropriation, 1959	-26,000,000
Balance unfunded as of 6/30/59	8,664,000
New contract authorization, 1960	+30,000,000
Total unfunded through 1960	38,664,000
1960 Budget Estimate (cash requirements)	-24,000,000
Balance to remain unfunded as of 6/30/60	14,664,000

Unfunded balance of $14,664,000 consists of:

(1) Obligations of $8,664,000 for which cash will not be required in 1960.

(2) $6,000,000 of the $30,000,000 authorized for 1960 which is not planned for obligation in 1960.

Analysis of Cash Requirements

1.	Unliquidated obligations 6/30/58		$19,462,953
2.	Estimated cash requirements to finance 1959 program	a/	+17,495,047
3.	Total cash requirements by 6/30/59		36,958,000
4.	Less cash on hand, 1959		-37,714,847
5.	Cash balance from 1959 available for use in 1960		-756,847
6.	Obligations in 1959 for which cash was not provided in line 2		9,420,847
7.	Estimated cash required to finance 1960 program	b/	+15,336,000
8.	Total cash required for 1960		24,000,000

a/ Based on 65% of new obligations (totaling $26,915,894) requiring cash payments during the fiscal year. This percentage is approximately in line with rate of cash payments in past years.

b/ Based on 65% of new obligations totaling $24,000,000 but reduced by $264,000 to provide rounded appropriation.

The following tabulation reflects the total program for the construction and maintenance of roads and trails on the national forest by combining the funds available under the appropriation "Forest roads and trails" with the permanent appropriation of 10% of national forest receipts. This permanent appropriation for Roads and Trails for States (10% fund) is estimated at $11,400,000 for 1960 compared with $8,885,000 for 1959 or an increase of $2,515,000.

PROJECT STATEMENT

Project	1958	1959 (estimated)	Increase or Decrease	1960 (estimated)
1. Construction of roads and trails	$33,790,155	$25,400,894	-$400,894 (1)	$25,000,000
2. Maintenance of roads and trails	9,910,802	10,400,000	- -	10,400,000
Total pay act costs (P.L. 85-462)	[535,628]	[1,114,055]	[- -]	[1,114,055]
Total obligations	43,700,957	35,800,894	-400,894	35,400,000
Unobligated balance brought forward	-825,864	- -	- -	- -
Transfer from "Roads and Trails for States "	-10,790,987	-8,885,000	-2,515,000	-11,400,000
Obligations incurred under unappropriated contract authorization	-7,748,106	-915,894	+915,894	- -
Total appropriation of estimate	24,336,000	26,000,000	-2,000,000	24,000,000

DECREASE

(1) A decrease of $400,894 is indicated for construction of forest roads and trails. This is a slight reduction from the $25,400,894 programmed in fiscal year 1959. Roads needed to maintain and accelerate timber cutting which cannot be financed within the $25,000,000 programmed for 1960 are planned for construction by purchasers of national forest timber.

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

For expenses necessary for carrying out the provisions of [section 23 of the Federal Highway Act approved November 9, 1921, as amended (23 U.S.C. 23, 23a)] title 23, United States Code, sections 203 and 205, relating to the construction and maintenance of forest development roads and trails, [including the construction, reconstruction, and maintenance of roads and trails on experimental areas under Forest Service administration, $26,000,000] $24,000,000, to remain available until expended, [and this amount may be used to the extent necessary] for liquidation of obligations incurred pursuant to authority contained in [section 106 of the Federal-Aid Highway Act of 1956 (23 U.S.C. 155) and section 6 of the Federal-Aid Highway Act of 1958 (Public Law 85-381)] title 23, United States Code, section 203: Provided, That funds available under the Act of March 4, 1913 (16 U.S.C. 501), shall be merged with and made a part of this appropriation: Provided further, That not less than the amount made available under the provisions of the Act of March 4, 1913, shall be expended under the provisions of such Act.

EXPLANATION OF CHANGES IN LANGUAGE

The first, second, and fourth changes would provide consistency with Public Law 85-767, approved August 27, 1958 (72 Stat. 885-921), which was enacted, "To revise, codify, and enact into law, title 23 of the United States Code, entitled Highways." Basic authorization for forest development roads and trails is now contained in 23 U.S.C. 205. This section also provides for "the construction, reconstruction, and maintenance of roads and trails on experimental areas under Forest Service administration" and duplicating language in the appropriation act is no longer necessary.

The third change would clarify the use of this appropriation for liquidation of obligations incurred pursuant to 23 U.S.C. 203. The first use of contract authorization was in fiscal year 1958 when action was started to incur obligations for road construction in advance of appropriations.

STATUS OF PROGRAM

The national forests must be made accessible before they can be fully developed; losses from fire, insects, disease, and soil erosion minimized; lands managed for optimum production of water, timber, forage, wildlife, and recreation benefits; and resources utilized for maximum economic return.

In fiscal year 1958 $9,910,802 was obligated for maintenance for traffic or preservation and $33,790,155 for construction and reconstruction of forest development roads and trails. In addition, Federal timber purchasers accomplished construction and reconstruction estimated to amount to $35,733,053 on development roads.

As of June 30, 1958 the forest development transportation system consisted of 149,750 miles of access roads and 115,375 miles of supplemental foot and horse trails. The system is maintained in part by the Government and in part by others, such as local public road authorities, private cooperators and permittees, and Federal timber purchasers. The following table shows how the system was maintained in fiscal year 1958:

	Miles (estimated)	
	Roads	Trails
Maintained for traffic or preservation by the Government	98,750	114,000
Maintained for traffic by others	51,000	1,375
Total	149,750	115,375

In fiscal year 1958 construction and reconstruction was accomplished on the transportation system as follows:

Item	Units of Work Completed (estimated)	
	By the Government	By Federal Timber Purchasers
Roads	839.1 Mi.	3,096.6 Mi.
Trails	179.9 Mi.	- -
Bridges	54 Ea.	55 Ea.

Field work on a new estimate of forest development road and trail needs for all purposes was about 80% complete at the close of the fiscal year.

(c) Acquisition of Lands for Cache National Forest

	Acquisition of Lands for National Forests, Special Acts	Acquisition of Lands for Cache National Forest	Total
Appropriation Act, 1959, and base for 1960	$10,000	$50,000	$60,000
Budget Estimate, 1960	10,000	50,000	60,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Acquisition of lands for Cache National Forest	$8,687	$113,416	$60,000
Unobligated balance brought forward	-3,416	-53,416	- -
Unobligated balance carried forward	53,416	- -	- -
Appropriation or estimate	58,687	60,000	60,000

CHANGE IN LANGUAGE

The estimates include a proposed change in the language of this item as follows (new language underscored):

Special Acts

> For the acquisition of land in the Cache National Forest, Utah, in accordance with the Act of May 11, 1938 (52 Stat. 347), as amended, $10,000, to be derived from forest receipts as authorized by said Act: Provided, That no part of this appropriation shall be used for acquisition of any land which is not within the boundaries of a national forest: Provided further, That no part of this appropriation shall be used for the acquisition of any land without the approval of the local government concerned.

This language change is proposed to indicate clearly that receipts are the source of appropriations for acquisition of land in Cache National Forest.

STATUS OF PROGRAM

Two appropriations are available for acquisition of lands for Cache National Forest. A $10,000 appropriation is available from national forest receipts when appropriated by Congress. A $50,000 appropriation is based on the Act of July 24, 1956 (70 Stat. 632), which authorized additional appropriations for the same purpose. Funds appropriated under the latter act must be matched by donation of funds or land of not less than equal value contributed by local agencies or persons. These contributions include costs of lands previously donated to the United States by local agencies or groups and national forest receipts used to purchase land which otherwise would have accrued to the benefit of the local counties, to the extent that these exceed contributions by the Federal Government. Review of past records indicates that the local contribution in accordance with the act, through September 30, 1958 is about $250,000. Thus there is sufficient matching credit available to meet the total non-Federal cost share required by the Act of July 24, 1956.

These funds are used to acquire lands within the Cache National Forest, Utah, which are critical from watershed and erosion standpoints to enable control and minimization of soil erosion and flood damage. These lands are in a depleted condition watershed-wise, and are flood and erosion hazards. Public ownership is required to restore such lands and assure against further depletion. In fiscal year 1958, 946 acres of these important watershed tracts were approved for purchase.

In 1959 it is planned to acquire with appropriated funds an additional 7,000 to 9,000 acres of these lands.

(d) Acquisition of Lands for Superior National Forest

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Acquisition of lands for Superior National Forest	$236,195	$531,895	- -
Unobligated balance brought forward	-268,090	-531,895	- -
Unobligated balance carried forward	531,895	- -	- -
Total pay act costs (P.L. 85-462)	[592]	[1,059]	- -
Appropriation or estimate	500,000	- -	- -

STATUS OF PROGRAM

This appropriation is for the purchase of land pursuant to the Act of June 22, 1948 (62 Stat. 568), as amended by the Act of June 22, 1956 (70 Stat. 326), to preserve the unique qualities of the remaining wilderness canoe area in the Superior National Forest, Minnesota. The Act of June 22, 1956 extended the area to which the purchase directive applies and authorized additional appropriations.

During the fiscal year 1958, 49 tracts containing 2,348 acres, costing $612,678, were negotiated for purchase although options were approved on only $222,641 by June 30. The remaining options totaling $390,037 were formally accepted early in fiscal year 1959. These included several resort and other improved tracts the existence of which materially impaired the unique quality of this remaining wilderness canoeing area. Acreage acquired in the area to which this law is applicable from June 1948 to date, through purchase and exchange, is 37,123 acres. Emphasis is placed on acquisition of improved tracts and tracts which because of location or character may be improved in the near future, as such tracts most seriously detract from or threaten the distinctive qualities of the canoeing area.

Within the area authorized for purchase there are still to be acquired 14 properties improved and used for commercial resort purposes, 68 properties with other improvements (mostly cabins), and 29,000 acres of private and tax forfeit lands not yet developed.

No appropriation was made for fiscal year 1959. Of the $531,895 balance shown for 1959, $390,037 involves land purchases negotiated in fiscal year 1958 but not formally obligated until 1959, which leaves $141,858 available for new land purchases. This amount will be used to purchase some of the key tracts as noted above.

(e) Cooperative Range Improvements

Appropriation Act, 1959, and base for 1960	$700,000
Budget Estimate, 1960	700,000

CHANGE IN LANGUAGE

The estimates include a proposed change in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

> For artificial revegetation, construction, and maintenance of range improvements, control of rodents, and eradication of poisonous and noxious plants on national forests [as authorized by] in accordance with section 12 of the Act of April 24, 1950 (16 U.S.C. 580h), to be derived from grazing fees as authorized by said section, $700,000, to remain available until expended.

This language change is proposed to indicate clearly that receipts from grazing fees are the source of appropriations for cooperative range improvements.

STATUS OF PROGRAM

Part of the grazing fees from the national forests, when appropriated, are used to protect or improve the productivity of the range, mainly by construction and maintenance of fences, stock-watering facilities, bridges, corrals, and driveways. These funds are advanced to and merged with the appropriation "Forest protection and utilization," subappropriation "Forest land management."

(f) Assistance to States for Tree Planting

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Tree planting	$491,225	$8,775	- -
Unobligated balance brought forward	- -	-8,775	- -
Unobligated balance carried forward	8,775	- -	- -
Total pay act costs (P.L. 85-462)	[1,302]	- -	- -
Appropriation or estimate	500,000	- -	- -

GENERAL PROVISIONS

CHANGES IN LANGUAGE

The estimates include proposed changes in the language of this item as follows (new language underscored; deleted matter enclosed in brackets):

Sec. 201. Appropriations available to the Forest Service for the current fiscal year shall be available for: (a) purchase of not to exceed [one hundred and twenty] seventy-five passenger motor vehicles for replacement only, and hire of such vehicles; operation and maintenance of aircraft and the purchase of not to exceed [six, of which four shall be] three for replacement only; (b) employment pursuant to the second sentence of section 706 (a) of the Organic Act of 1944 (5 U.S.C. 574), as amended by section 15 of the Act of August 2, 1946 (5 U.S.C. 55a), in an amount not to exceed $25,000; (c) [maintenance, improvement, and construction of aircraft landing fields in, or adjacent to, the national forests, in an amount not to exceed $250,000; (d)] uniforms, or allowances therefor, as authorized by the Act of September 1, 1954, as amended (5 U.S.C. 2131); [(e)] (d) purchase, erection, and alteration of buildings and other public improvements [:Provided, That any building, the cost of which as improved was $25,000 or more, shall not be improved within any fiscal year by an amount in excess of 5 per centum of such cost] (5 U.S.C. 565a) [except that an additional $400,000 may be used for improvements at the Forest Products Laboratory]; and [(f)] (e) expenses of the National Forest Reservation Commission as authorized by section 14 of the Act of March 1, 1911 (16 U.S.C. 514).

* * *

The first and second changes in language would provide authority for the Forest Service to replace 75 passenger motor vehicles and three aircraft. A complete justification for this need appears in the justification of estimates for motor vehicles and aircraft.

The third change deletes the proviso initially added in fiscal year 1954 in order to authorize the use of the Forest Roads and Trails appropriation for maintenance and construction of aircraft landing fields. The basis for using funds from this appropriation was that landing fields were provided in lieu of other means of transportation. However, Comptroller General Decision B-133846 dated January 16, 1958, stated "that the proposed use of the appropriation 'Forest Roads and Trails' as mentioned above is legally objectionable, and, therefore, may not be approved."

Since the purpose of the language added in fiscal year 1954 cannot now be accomplished, the language may be deleted. Its limitation of $250,000 has served no practical purpose, since costs during the period 1954 to 1958 have averaged only $50,000.

Maintenance, improvement, and construction of needed aircraft landing fields can be performed under the authority of subsection (e), changed to subsection (d) in the 1960 language, which authorizes the purchase, erection, and alteration of buildings and other public improvements. Each appropriation will pay for costs of aircraft landing fields on the basis of benefits derived by each program from the landing field. Future aircraft landing field construction will be determined on the basis of program needs and current availability of funds for construction of improvements.

The fourth, fifth, and eighth changes reletter the subsections, due to the elimination of subsection (c) of the 1959 Appropriation Act.

The sixth change eliminates the 5% limitation on improvement to existing buildings the individual cost of which is $25,000 or more. The 1959 Appropriation Act eliminated the dollar limitation on construction cost of individual buildings but retained the 5% limitation on improvements to existing buildings. The authority to improve buildings which has reached the building limitation provided in the appropriation act each year was started in 1937 with a 2% limitation. It was increased to 5% in 1958. The sole purpose was to permit improvements to existing buildings which could not be accomplished within the then existing building limitation specified in the appropriation act. Since the limitation on cost of new construction has been removed, the 5% authorization for improvements is not only of doubtful administrative value but in some instances it actually prevents accomplishment of needed construction work at least cost to the Government.

To illustrate the difficulty, a shop at Hill City, South Dakota, is larger than needed for equipment repair purposes. Additional space is needed for office and warehouse purposes. Considering available facilities and additional needs it would be most economical to convert the present building to a combination of office space for two district rangers, a small shop, and a warehouse. Present investment in the existing building is $23,000. Estimated cost of the proposed changes is $15,000. This would make a total cost of $38,000. Under the 1958 language, this project could have been accomplished under the dual purpose proviso in the building limitation, but this dual purpose proviso was eliminated in the 1959 Act. The 5% limitation which was retained in the 1959 language does not permit the improvement.

Another example is the office at McCall, Idaho, which is inadequate for present needs and an addition estimated to cost $25,000 is needed. Present investment in the existing building is about $30,000. It would be better and more economical to construct an addition to the present building than to build a separate office to take care of additional needs.

It has been determined that the 5% limitation prohibits this needed construction.

Under both of the above examples it would be legally permissable to proceed with construction of new buildings at much greater cost to the Government. However, this course of action would be a waste of funds and construction at the two locations has been deferred until fiscal year 1960. With elimination of the 5% limitation it will be possible to provide needed space at minimum cost by conversion of existing structures.

The seventh change eliminates language authorizing an additional $400,000 for improvements at the Forest Products Laboratory. This language was needed in fiscal year 1959 for replacement of the steam plant at the Forest Products Laboratory, Madison, Wisconsin. Funds for this purpose will be obligated in 1959 and the language will no longer be needed.

(g) Roads and Trails for States, National Forests Fund

Appropriation, 1959, and base for 1960	$8,885,000
Budget Estimate, 1960	11,400,000
Increase (due to an estimated increase in national forest receipts in fiscal year 1959)	+2,515,000

The permanent appropriation of 10% of national forest receipts pursuant to the Act of March 4, 1913 (16 U.S.C. 501) is transferred to and merged with the annual appropriation for "Forest Roads and Trails."

(h) Expenses, Brush Disposal, Forest Service

Appropriation, 1959, and base for 1960	$5,000,000
Budget Estimate, 1960	5,000,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
1. Brush disposal	$4,116,101	$5,000,000	$5,000,000
2. Brush disposal--fighting forest fires	1/ 550,369	- -	- -
Total pay act costs (P.L. 85-462)	[69,376]	[166,611]	[166,611]
Total available or estimate	4,666,470	5,000,000	5,000,000
Repayment from "Forest protection and utilization, Fighting forest fires" for obligations incurred in 1958	- -	-550,369	- -
Unobligated balance brought forward	-2,675,520	-1,775,362	-2,325,731
Unobligated balance carried forward	1,775,362	2,325,731	2,325,731
Total appropriation or estimate	3,766,312	5,000,000	5,000,000

1/ Reflects obligation of $550,369 in 1958 for fighting forest fires which was repaid from the fiscal year 1959 appropriation for Fighting Forest Fires.

STATUS OF PROGRAM

Timber cutting and removal creates slash, debris, or brush which may in turn materially increase the fire hazard. Prior to the sale of national forest timber, consideration must be given to treatment of these fuel accumulations to avoid creating large continuous areas of high risk slash fuels. Because of this factor, national forest timber sale contracts require treatment of the debris resulting from cutting operations to the degree necessary to reduce the fire hazard to a point near normal. Depending on circumstances, the work may be performed either by the timber purchaser or by the Government. The Brush Disposal appropriation represents deposits by the timber purchaser to cover costs of the work when it is performed by the Government as authorized under Section 6 of the Act of April 24, 1950 (16 U.S.C. 490).

There is a wide variation between Regions in the effect that cutting of timber has on fire hazard, and consequently the manner in which debris is treated. In the three eastern Regions, the volume cut per acre is relatively low, utilization is close, and the general humid atmospheric conditions result in rapid decomposition of debris. Very little special slash disposal work is done on sale areas in these three Regions, the exception being in some of the sales in the pine type where a heavier cut per acre is often made, such as the jack pine stands of Minnesota. In contrast to the light slash disposal requirements in the eastern Regions, the cost of slash abatement on most sale areas of the western Regions is high. Treatment of the slash is essential if serious and catastrophic fires are to be prevented. The type of treatment varies considerably due to different methods of cutting. For instance, clear cut areas in the Douglas-fir region are broadcast burned. In selectively cut areas the debris may be piled for burning and this may be done over the whole area or only in strips which break the area up into blocks.

In the western Regions purchasers are required to perform slash disposal on some sales or to perform certain phases of the work which they can do more efficiently with their crews and equipment while actively engaged in other phases of the operation. While slash disposal follows general prescriptions within regions, the individual needs of each sale offering are planned and appraised prior to advertisement and appropriate specific requirements are incorporated into each timber sale contract. In each instance the least expensive method or combination of methods is used which will attain adequate protection of the area. In some instances adequate protection from fire is attained at less cost by providing additional protection for sale areas until the slash hazard reverts to near normal. Greater intensity of fire protection for several years may be less costly than complete slash disposal immediately after cutting. In such cases Brush Disposal funds are used in providing the needed manpower and facilities.

(i) Forest Fire Prevention

Appropriation, 1959, and base for 1960	$20,000
Budget Estimate, 1960	20,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Forest fire prevention	$16,276	$30,929	$20,000
Unobligated balance brought forward	-4,825	-10,929	- -
Unobligated balance carried forward	10,929	- -	- -
Total pay act costs (P.L. 85-462)	[358]	[1,048]	[1,048]
Total appropriation or estimate	22,380	20,000	20,000

STATUS OF PROGRAM

Current Activities: The Smokey Bear licensing program officially known as the Commercial (Fire) Support Educational Program is an important part of the Cooperative Forest Fire Prevention Campaign and has been in effect since 1952. The Campaign itself has been conducted each year since 1942 as a cooperative project of the State Foresters and the Forest Service, United States Department of Agriculture, and is a public service program of the Advertising Council. The purpose of this campaign is to utilize the free public service resources of the various national advertising channels such as car cards, poster display systems, radio and television networks and magazine and newspaper allocation plans in developing public cooperation in the prevention of man-caused forest fires. Since 1945 this campaign has been built around Smokey Bear, who has become recognized and accepted by the public as a nation-wide symbol of forest fire prevention.

Under authorization of Public Law 359 of the 82nd Congress, the Secretary of Agriculture has issued rules and regulations governing the licensing program. These licenses specify payment of royalties (usually 5%) and set up certain controls for administering the program and collecting the royalties including advance deposits to protect the Government's interest. Through the sale and distribution of the various products Smokey has become a welcome visitor in more homes each year.

Selected Examples of Recent Progress:

1. In 1957 the results of the Cooperative Forest Fire Prevention Campaign were so successful that on May 8, 1958 President Eisenhower presented Smokey statuettes to four organizations for their outstanding support in forest fire prevention. These organizations were The Advertising Council, Inc., The American Forestry Association, The Town Council of Capitan, New Mexico, and the American Forest Products Industries.

2. Artwork has been prepared and requisition forms sent to the field to place orders for calendar year 1959. Requests for platters on the new radio series of 15 five-minute programs, total over 1,300 sets. The first 550 TV kits have been mailed to all TV stations. A second nationwide mailing is scheduled for August.

3. The Advertising Council reported that donated public service time space and talent on radio-TV, newspapers, magazines, and car cards totaled $10,000,000 in 1957.

4. Smokey Bear is receiving more attention in foreign countries than ever before. Requests for Junior Forest Ranger kits have been received from as far away as Pakistan, Union of South Africa, Australia, Malaya, and from all European countries. The Little Golden Book, "Story of Smokey Bear," has been printed in French, Swedish, Norwegian, and in a special Australian edition. Royalties from these Golden Books now total $8,000.

5. The Canadian Forestry Association received a patent in 1957 to use Smokey Bear in Canada. They have a cooperative agreement with the Forest Service and Association of State Foresters, specifying how Smokey can best be used in that country.

(j) Restoration of Forest Lands and Improvements

Appropriation, 1959, and base for 1960	$100,000
Budget Estimate, 1960	100,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Restoration of forest lands and improvements (appropriation or estimate)	- -	$100,000	$100,000

STATUS OF PROGRAM

Recoveries from cash bonds or forfeitures under surety bonds by permittees or timber purchasers, who fail to complete performance, are used to complete improvement, protection, or rehabilitation work on lands under Forest Service administration. Funds received as settlement of a claim are used for improvement, protection, or rehabilitation made necessary by the action which led to the cash settlement (72 Stat. 217-218).

(k) Payment to Minnesota (Cook, Lake, and St. Louis Counties) from the National Forests Fund

Appropriation, 1959, and base for 1960	$48,000
Budget Estimate, 1960	48,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Payment to Minnesota (appropriation or estimate)	$47,951	$48,000	$48,000

STATUS OF PROGRAM

The Act of June 22, 1948, as amended, (16 U.S.C. 577c-577h) provides that the Secretary of the Treasury, upon certification of the Secretary of Agriculture, shall pay to the State of Minnesota at the close of each fiscal year an amount equivalent to three-fourths of one percent of the fair appraised value of certain national forest lands in the counties of Cook, Lake, and St. Louis situated within the Superior National Forest. The Act further provides that payment to the State shall be distributed to each of these counties in conformity with the fair appraised value of such national forest lands in each county.

(1) Payments Due Counties, Submarginal Land Program, Farm Tenant Act (Permanent Appropriation)

Appropriation, 1959, and base for 1960	$400,000
Budget Estimate, 1960	400,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Payments due counties (appropriation or estimate)	$558,249	$400,000	$400,000

STATUS OF PROGRAM

At the end of each calendar year, 25% of the revenues from the use of submarginal lands are paid to counties under the provisions of Title III of the Bankhead-Jones Farm Tenant Act, approved July 22, 1937 (7 U.S.C. 1012).

(m) Payments to School Funds, Arizona and New Mexico, Act of June 20, 1910

Appropriation, 1959, and base for 1960	$105,474
Budget Estimate, 1960	105,474

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Payments to school funds (appropriation or estimate)	$105,474	$105,474	$105,474

STATUS OF PROGRAM

Under provisions of the Act of June 20, 1910 (36 Stat. 562,573) certain areas within national forests were granted to the States for school purposes. The percentage that these lands are of the total national forest area within the State is used in determining payments to the States. The receipts from all national forest land within the State are used as the basis for applying the percentage. For example, if total receipts for the State are $100,000 and if 10% of lands are in the "granted for school purposes" category, the payment to the State would be $10,000. The amounts so paid are deducted from the net receipts before computing the 25% payments to States.

As soon after the close of the fiscal year as the receipts from national forests and the area of school lands in the States of Arizona and New Mexico are determined, the payments are made to the States. Estimated payments in fiscal year 1959 to Arizona will be $104,850 and to New Mexico $624.

(n) Payments to States and Territories from the National Forests Fund

Appropriation, 1959, and base for 1960	$22,215,000
Budget Estimate, 1960	28,575,000
Increase (due to an estimated increase in the national forest receipts for the fiscal year 1959)	+6,360,000

PROJECT STATEMENT

Project	1958	1959 (estimated)	Increase	1960 (estimated)
Payments to States and Territories (appropriation or estimate)	$26,975,307	$22,215,000	+$6,360,000(1)	$28,575,000

INCREASE

(1) The increase of $6,360,000 in this item for payments to States and Territories in the fiscal year 1960 results from an estimated increase in national forest receipts for the fiscal year 1959.

STATUS OF PROGRAM

The Act of May 23, 1908, as amended (16 U.S.C. 500) requires, with a few exceptions, that 25% of all money received from the national forests during any fiscal year be paid to the States and Territories in which the forests are located, for the benefit of public schools and public roads of the county or counties in which such national forests are situated. The amount of this appropriation varies each year in direct proportion to national forest receipts during the previous fiscal year.

The amounts set aside from receipts collected for the sale of national forest timber, grazing and special use permits, etc., before the 25% is applied are listed below:

1. Payment to the State of Minnesota covering certain national forest lands in the Counties of Cook, Lake, and St. Louis situated within the Superior National Forest, is made under the terms of the Act of June 22, 1948, Public Law 733. Receipts collected from the areas covered by this Act are excluded when the 25% payment to the State of Minnesota is computed.

2. For lands in certain counties in Utah, Nevada, and California, the States receive 25% of receipts only after funds, if made available by Congress, have been set aside for the acquisition of national forest lands within the specified national forests under the terms of special acts authorizing appropriations from forest receipts for this purpose.

3. Payments to the States of Arizona and New Mexico under the provisions of the Act of June 20, 1910, of shares of the gross receipts from the national forests in those States which are proportionate to the areas of land granted to the States for school purposes within the national forests.

(o) Construction of Improvements, Salt Lake City, Utah

PROJECT STATEMENT

Project	1958	1959 (estimated)	1960 (estimated)
Construction of improvements, Salt Lake City, Utah (appropriation or estimate)	- -	- -	$16,000

STATUS OF PROGRAM

Funds from the sale of a Forest Service fire warehouse lot together with improvements thereon, to Salt Lake City, Utah, will be used in the construction of other similar facilities (72 Stat. 589).

(p) Working Capital Fund, Forest Service

This fund finances on a reimbursable basis various services such as repairing and replacing equipment, stocking and issuing supplies, and operation of photographic and reproduction facilities in support of programs of the Forest Service (16 U.S.C. 579b). These service operations serve programs of fire protection, timber utilization, construction and maintenance of roads and other improvements, reforestation, grazing, watershed, forest and forest products research, and kindred conservation activities of the Forest Service, including cooperative assistance with other Federal agencies, States, counties, and individuals engaged in the same objectives. Government investment in the fund as of June 30, 1958, including donated assets at its inception and retained earnings was $15,379,340. By the end of 1960 the investment is anticipated to be $18,524,340, an increase of $3,145,000, which represents estimated retained earnings and donations during 1959 and 1960.

(q) Cooperative Work, Forest Service (Trust Fund)

Contributions are received from cooperators, viz., counties, States, timber sale operators, individuals, and associations, and are expended by the Forest Service in accordance with the terms of the applicable cooperative agreements. The work consists of protection and improvement of the national forests, and forest investigations and protection, reforestation, and administration of private forest lands.

The major programs conducted under the account "Cooperative Work, Forest Service" are described below in terms of the projects reflected in the statement at the end of this section.

1. Construction and Maintenance of Roads and Trails, and

2. Construction and Maintenance of Other Improvements:

Under the Acts of June 30, 1914 (16 U.S.C. 498) and March 3, 1925 and April 24, 1950 (16 U.S.C. 572) deposits for cooperative work are accepted from State and local government agencies, associations, Federal timber purchasers, and others for the construction and maintenance of roads, trails, and other improvements which are of mutual benefit to the cooperators or of benefit to the public at large.

3. Protection of National Forests and Adjacent Private Lands:

The Act of June 30, 1914 (16 U.S.C. 498) authorizes the acceptance of deposits for the protection of the national forests and the Act of March 3, 1925, as amended by section 5, Act of April 24, 1950 (16 U.S.C. 572), authorizes the acceptance of contributions for the protection of private lands in or near the national forests. The major portion of the obligations is for the protection of private lands from fire. This arrangement helps both parties since there are millions of acres of private forest land intermingled with Federal ownership on the national forests. The lands in private ownership are usually in small tracts. It would be uneconomical for the owner to set up a fire control organization for the protection of his land. The advantage to the Government is that in many cases it would be necessary to suppress the fires on the private land without reimbursement in order to protect the adjoining Federal land.

4. Sale Area Betterment (including reforestation) and Scaling:

Sale area betterment

Under section 3 of the Act of June 9, 1930 (16 U.S.C. 576b) funds are collected from timber sale operators to insure establishment, after cutting, of a new crop and to take special measures to improve the quality of the future crop of timber. Such expenditures are essential to maintain productivity on many sale areas and to insure marketability of the next stand of timber. These funds are used on the areas cut over by timber purchasers.

The average collection in fiscal year 1958 was $1.24 per thousand board feet cut on the national forests. In the Lake States Region, the amount collected is used largely for reforestation to supplement and improve natural regeneration on the cutover areas. In the South, a major problem is to control inferior hardwoods and thereby maintain a balance between desirable hardwoods and pine on the highly productive pine-producing land and most of the amount collected is used for removing worthless trees which otherwise would crowd out seedlings of desirable species, either hardwood or pine, on cutover areas.

During fiscal year 1958, obligations for sale area betterment work on all national forests totaled approximately $9.2 million.

Accomplishments for this program are reported under the Forest Land Management subappropriation along with accomplishments for reforestation and stand improvement for that subappropriation.

Scaling

Under provisions of section 210 of the Act of September 21, 1944 (16 U.S.C. 572a) acceptance of deposits from timber purchasers for cooperative scaling service is authorized. Such arrangements are established only when requested by the operator and when it is determined the additional work can be performed without net cost to the Government. Where cooperative scaling is done, the cost of the job is divided equitably between the Government and the operator on the basis of time spent on obtaining the records required by each party. The operator's share is deposited in the cooperative fund. This arrangement is possible in only a limited number of situations.

Through avoiding unnecessary duplication of personnel, it permits more efficient operation by both the purchaser and the Government.

5. Research Investigations:

The Acts of June 30, 1914 and May 22, 1928 authorize the acceptance of deposits for forest investigations. Deposits are received from States, associations, industrial concerns, and others to finance research projects which are of mutual benefit to both parties. For example, when a comprehensive forest survey is inaugurated in a State, the State authorities may make a deposit to the Cooperative Work fund for more intensive or rapid completion of the survey than would otherwise be possible. In other cases, an industrial concern, State or association may ask a research unit of the Forest Service to undertake a research project in which they and the Forest Service are interested. They will deposit funds either in a single sum or on a continuing basis to partially or wholly cover the cost of the research. The results of such investigations are furnished to the depositor as well as adding to public knowledge on the particular subject.

6. Administration of Private Lands:

The Act of March 3, 1925, as amended by section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for the management of private lands. These contributions are made by private owners having land intermingled with or adjacent to national forests who wish these lands managed in accordance with good forest management practices. Their holdings are usually too small to warrant the employment of professional foresters to administer such tracts. The advantages to the Government include the avoidance of possible high fire hazard areas resulting from improper cutting practices, the elimination of the necessity of precisely marking the boundaries of the private land, and additional private forest land handled under proper forest practices.

7. Reforestation (private lands):

The Act of March 3, 1925, as amended by section 5, Act of April 24, 1950 (16 U.S.C. 572) authorizes the acceptance of contributions for reforestation of private lands situated within or near a national forest. This work is limited to areas of private land within a planting project on the national forests or to areas in which certain civic and other public-spirited organizations have taken an interest.

8. Statement on Utilization of Funds:

Following is a statement of funds received and obligated and balances available by major activities:

COOPERATIVE WORK, FOREST SERVICE

Trust Fund

Project	Balance Available June 30, 1957	Actual fiscal year 1958			Estimate fiscal year 1959			Estimate fiscal year 1960		
		Funds Received	Obligations	Balance	Funds Received	Obligations	Balance	Funds Received	Obligations	Balance
1. Construction and maintenance of roads and trails	$710,620	$1,088,010	$1,122,003	$676,627	$1,000,000	$1,000,000	$676,627	$1,000,000	$1,000,000	$676,627
2. Construction and maintenance of other improvements	271,508	341,354	368,962	243,900	350,000	350,000	243,900	350,000	350,000	243,900
3. Protection on national forests and adjacent private land:										
(a) Fire	225,219	1,446,091	1,370,485	300,826	1,400,000	1,400,000	300,826	1,400,000	1,400,000	300,826
(b) Other	663,074	842,637	815,558	690,153	800,000	800,000	690,153	800,000	800,000	690,153
4. Sale area betterment (including reforestation) and scaling	12,962,887	7,955,963	9,604,525	11,314,325	8,430,000	9,930,000	9,814,325	8,430,000	9,930,000	8,314,325
5. Research investigations	254,112	884,454	872,827	265,739	900,000	900,000	265,739	900,000	900,000	265,739
6. Administration of private lands	18,114	55,997	52,077	22,034	60,000	60,000	22,034	60,000	60,000	22,034
7. Reforestation (private lands)	43,746	64,385	85,806	22,324	60,000	60,000	22,324	60,000	60,000	22,324
Total	15,149,280	12,678,891	14,292,243	13,535,928	13,000,000	14,500,000	12,035,928	13,000,000	14,500,000	10,535,928

Note:--Balances carried forward are due primarily to necessity of deferring work for which funds are deposited until the most practicable time. For instance, funds for sale area betterment are received in advance of cutting, but work cannot be started until cutting operations are completed. The time lag sometimes extends for several years, depending on the amount of preparatory work required in the sale area, weather conditions, etc.

Above obligations for 1958 include transfers to Forest Reserve Fund of $5,948 and refunds to cooperators of $89,756.

STATEMENT OF OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS

(Includes only those amounts which, by November 30, 1958, were actually received or programmed for 1959 or 1960. Since work for other agencies is performed on a service basis, at the request of those agencies and for their benefit, it is not practicable to estimate in advance the amounts to be received in most cases.)

Item	Obligations, 1958	Estimated Obligations, 1959	Estimated Obligations, 1960
Allotments from:			
Watershed Protection - For planning, installing improvement measures and investigations in river basins in connection with watershed protection activities	$759,030	$914,403	$805,000
Flood Prevention - For measures primarily for flood prevention (works of improvement)	1,868,844	2,172,644	1,735,000
Agricultural Conservation Program Service - For cooperation in administering the naval stores program	126,521	131,110	131,110
Conservation Reserve, Soil Bank Programs - For assistance in the conservation reserve program, primarily for expansion of production of tree seedlings	4,243,267	2,596,000	2,716,000
Great Plains Conservation Program - For research services, advice, and guidance to agencies conducting nursery production and tree planting phases of the Great Plains Conservation Program	29,756	32,903	32,000
Total Allotments	7,027,418	5,847,060	5,419,110
Allocations (Advanced from other Agencies):			
International Cooperation Administration - For economic and technical assistance programs	100,337	231,387	- -
Department of the Army - For relocation and replacement of Forest Service facilities necessitated by development of dams and reservoirs	24,447	16,000	8,423
Office of Civil and Defense Mobilization - For rural fire defense program	- -	- -	128,000
Total Allocations	124,784	247,387	136,423

(Continued on next page)

Item	Obligations, 1958	Estimated Obligations, 1959	Estimated Obligations, 1960
Trust Funds:			
Cooperative Work, Forest Service:			
Trust funds deposited by cooperators for the accomplishment of certain projects which are of mutual benefit to the Forest Service and such co-operators as follows:			
1. Construction and maintenance of roads and trails	1,122,003	1,000,000	1,000,000
2. Construction and maintenance of other improvements	368,962	350,000	350,000
3. Protection of national forests and adjacent private land	2,186,043	2,200,000	2,200,000
4. Sale-area betterment and scaling	9,604,525	9,930,000	9,930,000
5. Research investigations	872,827	900,000	900,000
6. Administration	52,077	60,000	60,000
7. Reforestation	85,806	60,000	60,000
Total, Cooperative Work	14,292,243	14,500,000	14,500,000
Miscellaneous Contributed Funds (principally cooperative work on blister rust control)	2,297	17,414	- -
Technical Services and Other Assistance, Agricultural Conservation Program - For technical assistance in formulating and carrying out the forestry portion of the agricultural conservation cost-sharing programs in participating counties	16,725	4,360	- -
Total, Trust Funds	14,311,265	14,521,774	14,500,000
Obligations under Reimbursements from Governmental and Other Sources:			
Forest protection and utilization a/	3,516,440	5,100,000	5,100,000
Forest roads and trails and Roads and trails for States b/	667,545	2,000,000	2,000,000
All other	35,944	83,000	83,000
Total, Reimbursements	4,219,929	7,183,000	7,183,000
TOTAL, OBLIGATIONS UNDER ALLOTMENTS AND OTHER FUNDS	25,683,396	27,799,221	27,238,533

a/ Primarily from other Government agencies, States, and counties, for forest fire protection and suppression, insect and disease control, forest research, investigations at Forest Products Laboratory, surveys, land appraisals, mapping, cruising timber, preparation of timber management plans, snow scale readings, and other miscellaneous services.

b/ Primarily road construction for U. S. Army.

NOTE--In addition, foreign currencies are available under Section 104(k) of Public Law 480 for forest research projects abroad. This work is conducted by the Agricultural Research Service of the Department of Agriculture with the assistance of the Forest Service in the review and appraisal of forest research projects undertaken abroad.

PASSENGER MOTOR VEHICLES AND AIRCRAFT

Replacement of passenger motor vehicles

During fiscal 1960 it is proposed to replace 75 passenger cars, 9 of which are station wagons, and all of which will meet replacement standards.

Based on the planned schedule of replacements, the Forest Service will have a total of 658 passenger vehicles in fiscal 1960. On analysis of vehicle use and age pattern, the fleet is expected to include 85 units which will meet or exceed replacement standards before replacements are received.

As of June 30, 1958, the age and mileage classes of the Forest Service net active fleet were:

Age Data		Mileage Data	
Year Model	No. of Vehicles	Lifetime Mileage	No. of Vehicles
1953 or older	58	Over 100,000	2
1954	59	80,000 to 100,000	6
1955	137	60,000 to 80,000	34
1956	145	40,000 to 60,000	153
1957	126	20,000 to 40,000	216
1958	133	0 to 20,000	247
Total	658		658

Use of Vehicles

Passenger motor vehicles are used by (1) forest officers in the protection, utilization, management, and development of the national forests and land utilization projects and in the program for control of forest pests; (2) research technicians on experimental forests and ranges, on field research projects and forest surveys; (3) foresters engaged in carrying out the laws providing for State and private forestry cooperation; and (4) regional office field-going administrative officers in performing, directing, and inspecting field work.

The Forest Service is essentially a field organization and its passenger motor vehicles are located mainly at regional, national forest, and ranger district headquarters, land utilization projects, and experimental forests and ranges. There are over 232 million acres within the exterior boundaries of the national forests and land utilization projects. About 435 million acres of State and private forest land are included within the areas which benefit from Federal participation in the cooperative forest program. Much of this area is without common carrier service, and most forest areas and research centers are remote from commercial travel routes, requiring extensive use of motor vehicles as a means of transportation. The major portion of transportation needs, particularly at forest regional and supervisor levels and at other larger headquarters, involves multiple passenger use and can be more expeditiously and economically met by use of sedans and station wagons than by other types of vehicles.

Justification of Replacements

Dependability of passenger vehicles is an important factor in keeping work programs on schedule and in meeting emergencies. Vehicle breakdowns, while on field travel, cause disruptions and delays in field work as well as loss of effective work time of employees. The continued use of over-age equipment is undesirable from a safety standpoint since most of it is operated over rough narrow winding roads in mountainous country under adverse conditions. This use results in excessive operating and repair expenses when vehicles reach or exceed replacement standards.

In order to maintain passenger cars in a safe and satisfactory operating condition, it is the policy of the Forest Service to schedule periodic preventive maintenance inspections, services, and tune-ups to reduce the necessity for costly major repairs and overhauls, and to minimize lost time resulting from field breakdowns.

It is desirable to maintain a reasonable balance in the age class of the passenger vehicle inventory. The age class distribution is based upon conforming with replacement standards which recognize that some units will be retired under the age standard and others under the use standard. Prescribed replacement standards, although applicable, are not appropriate for all Forest Service vehicles because of the wide range of operating conditions and the comparatively short field season in many of the national forests at higher elevations. Decision on replacement of passenger vehicles which reach replacement age is based on an appraisal of each unit. This involves a review of the history card combined with a mechanical inspection of the vehicle's condition and repair liability. When such appraisal indicates that the vehicle is satisfactory for further service without unreasonable repair expenditures, it is retained and assigned to lighter work, even though such action tends to upset the age standards for the fleet inventory.

In addition to appraising the condition of vehicles selected for replacement, the Forest Service analyzes current work plans and programs in determining replacement needs. This analysis includes a careful study of the number of vehicles needed at each field station, using as a guiding principle the ownership of only the minimum number of dependable units required to serve programs for which funds are budgeted.

The vehicles selected for replacement are those which it has been determined cannot be operated another season without excessive repair expense. They are unsatisfactory for further use both as to safety and mechanical condition.

Essentially all passenger vehicles are pooled for use by all activities with replacement of pooled units financed from a Working Capital Fund. All appropriations reimburse this fund in ratio to use of vehicles on activities financed by the respective appropriations.

Replacement of Aircraft

The 1960 estimates propose replacement of two airplanes and one helicopter.

The Forest Service currently has 33 aircraft consisting of the following:

12	light reconnaissance airplanes
10	medium and heavy cargo and transport airplanes (8 medium; 2 heavy)
3	forest spray airplanes (Stearman, Piper, and TBM)
1	helicopter
7	torpedo bomber airplanes
33	Total aircraft, all types

The reconnaissance and transport airplanes are used for transportation of administrative personnel, firefighters, including "smoke jumpers," equipment and supplies, to remote inaccessible areas where airplane service of commercial operators is inadequate or unavailable, for fire reconnaissance and detection, for location of incipient outbreaks of forest insect pests, and in appraising the scope and seriousness of infestations in forested areas. The forest spray airplanes are used for research and development work in forest insect control. The helicopter is used in experimental tactical forest fire suppression work in southern California.

Seven Grumman Avenger single engine torpedo bombers (Navy TBM) are used in direct tactical forest fire fighting.

It will be necessary to replace one reconnaissance airplane, one medium cargo and transport airplane, and the helicopter. These aircraft have reached an age and total number of flying hours on the airframe where it is uneconomical to overhaul or modernize them to meet the airworthiness requirements of Civil Air Regulations. Since Forest Service aircraft are operated to a large extent over rough mountainous terrain where landing fields (and landing spots for helicopters) are poor and scarce, it is especially important that they be maintained to provide maximum performance and dependability.

The proposed replacement aircraft are needed to guide complicated aerial attack on forest fires by privately-owned airtankers and helicopters, to facilitate detection patrol and reconnaissance, to conduct experiments and field tests of new aerial attack devices and techniques, and to transport smokejumpers, fire fighters, equipment and supplies in remote areas where airplane services of commercial operators are inadequate or unavailable. In addition, they are needed for locating incipient outbreaks of forest pests, appraising the scope and seriousness of infestation in forested areas, and directing and evaluating effectiveness of pest control operations.